Finisar

Product Specification

2.5Gbps 850nm VCSEL, LC TOSA

HFE4190-441, HFE4191-441

PRODUCT FEATURES

- 850nm multi-mode oxide isolated VCSEL
- Extended Temperature Range Operation (– 40 to +85 deg operating range)
- Capable of modulation operation from DC to 2.5Gbps
- TO-46 tilt window metal can component, prealigned into LC Sleeve
- Designed for drive currents between 3-15mA average
- Packaged with a back monitor
- Attenuated window can

These products are high-performance 850nm VCSELs (Vertical Cavity Surface-Emitting Lasers) designed for high-speed data communications and packaged with a custom designed power monitor diode. The power monitor diode can be used with appropriate feedback control circuitry to set a maximum power level for the VCSEL. These combined features simplify design for high data rate communication and eye safety.

These products are designed to be used with inexpensive silicon or gallium arsenide detectors, but excellent performance can also be achieved with some indium gallium arsenide detectors (see HFD3180-103 and HFD3180-108 product data sheets).

VCSELs produce circularly symmetric, non-astigmatic, narrow divergence beams that, with appropriate lensing, fiber couple all of the emitter power. These LC TOSA products are pre-aligned and focused fiber optic transmitters designed to interface with 50/125 and 62.5/125 m multi-mode fiber

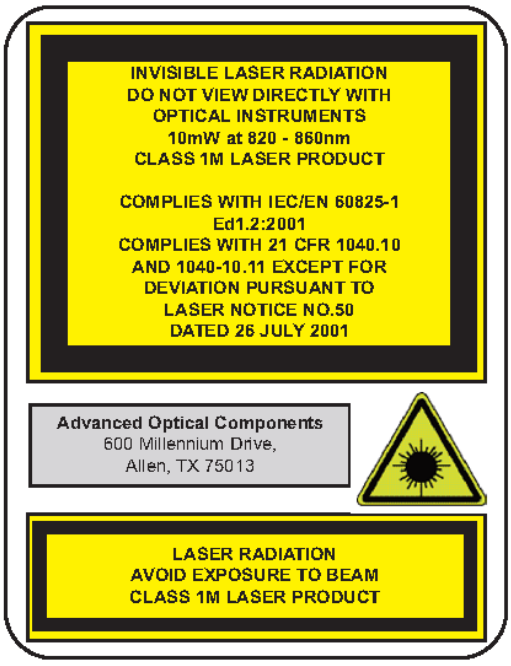
PRODUCT SELECTION

Part Number	Description
HFE4190-441	LC TOSA with attenuated TO-46 component, VCSEL with Back Monitor Photodiode, Anode of VCSEL common with Photodiode Cathode
HFE4191-441	LC TOSA with attenuated TO-46 component, VCSEL with Back Monitor Photodiode, Cathode of VCSEL common with Photodiode Anode

I. Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-40 to +85°C
Case Operating Temperature	-40* to +85°C
Lead Solder Temperature	260°C, 10 sec.
Laser continuous average current	12mA
Laser peak forward current with pulse width less than 1us	18mA
Laser reverse voltage	5V
ESD Exposure (Human Body Model)	225V[1]

[1]Heel and wrist straps must be used on a properly grounded workstation



Notice

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 operations section for extended periods of time may affect reliability.

Notice

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

II. Electro-Optical Characteristics

VCSEL Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Average Fiber Coupled Power	I_F = 7mA	P_{OC}		0.500		mW	2
Minimum coupling efficiency including wiggle	I_F = 7mA		55			%	2
Threshold Current		I_{TH}	0.5	1.8	2.5	mA	
Threshold Current maximum deviation from 25°C value	T_A = 0°C to 70°C	ΔI_{TH}	-0.5		1	mA	3
	T_A = 25°C to 85°C	ΔI_{TH}			1.7	mA	3
	T_A = -40°C to 25°C	ΔI_{TH}			2.5	mA	3
Temperature at minimum threshold current		T_O	-20		50	°C	3
Slope Efficiency	T_A = 25°C	η	0.04	0.125	0.16	mW/mA	4
	T_A = -40°C	η			0.200	mW/mA	
	T_A = 85°C	η	0.03			mW/mA	
Slope Efficiency Temperature variation	T_A = 0°C to 70°C	$\Delta\eta/\Delta T$		-6000		ppm/°C	5
Peak Wavelength	I_F = 7mA, T_A = 0°C to 85°C	λ_P	830	850	860	nm	
λ_P Temperature Variation	I_F = 7mA, T_A = -40°C to 85°C	$\Delta\lambda_P/\Delta T$		0.06		nm/°C	
Spectral Bandwidth, RMS	I_F = 7mA	$\Delta\lambda$			0.65	nm	
Laser Forward Voltage	I_F = 7mA	V_F		1.8	2.0	V	
Rise and Fall Times	Pavg = 0.625mW, Extinction Ratio = 10	t_r t_f			130 150	ps	6
Relative Intensity Noise	1 GHz BW, I_F = 7mA	RIN		-130	-122	dB/Hz	
Series Resistance	I_F = 7mA , T_A = 25°C	R_S	25	35	50	Ω	
	T_A = -40°C	R_S			60	Ω	
	T_A = 85°C	R_S	20			Ω	
Series Resistance Temperature Coefficient	I_F = 7mA, T_A = 0°C to 70°C	$\Delta R_s/\Delta T$		-3000		ppm/°C	7
Photodiode Parameters	**Test Condition**	**Symbol**	**Min.**	**Typ.**	**Max.**	**Units**	**Notes**
Monitor Current	Poc = 0.5mW, T_A = 25°C	I_{PD}	0.1		0.6	mA	
	Poc = 0.5mW, T_A = -40°C	I_{PD}	TBD		TBD		
	Poc = 0.5mW, T_A = +85°C	I_{PD}	TBD		TBD	mA	
Monitor current Temperature Variation	Poc = 0.5mW, 0°C to 70°C	$\Delta I_{PD}/\Delta T$		TBD		%/°C	
Monitor Current Tracking		Deltrk		TBD			8
Dark Current	Po = 0mW, V_R = 3V	I_D			20	nA	
PD Capacitance	V_R = 0V, Freq = 1MHz V_R = 3V, Freq = 1MHz	C		75 40	100 55	pF	

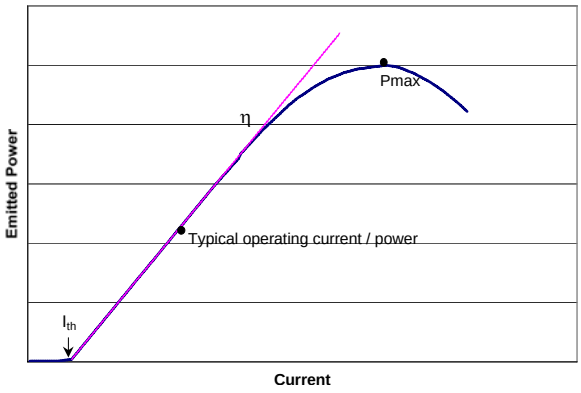
Notes:

1. Reliability is a function of temperature, see www.finisar.com for details.
2. For the purpose of these tests, I_F is DC current.
3. Threshold current varies as $(T_A - T_O)^2$. It may either increase or decrease with temperature, depending upon relationship of T_A to T_O. The magnitude of the change is proportional to the threshold at T_O.
4. Slope efficiency is defined as $\Delta P_O/\Delta I_F$.
5. To compute the value of Slope Efficiency at a temperature T, use the following equation:
   $\eta(T) \approx \eta(25^oC)*[1+(\Delta\eta/\Delta T)*(T-25)]$
6. Rise and fall times specifications are the 20% - 80%. Most of the devices will measure <135ps fall time. Rise and fall times are sensitive to drive electronics.
7. To compute the value of Series Resistance at a temperature T, use the following equation:
   $R_S(T) \approx R_S(25^oC)*[1+(\Delta R_S/\Delta T)*(T-25)]$
8. Monitor current tracking is defined as follows:

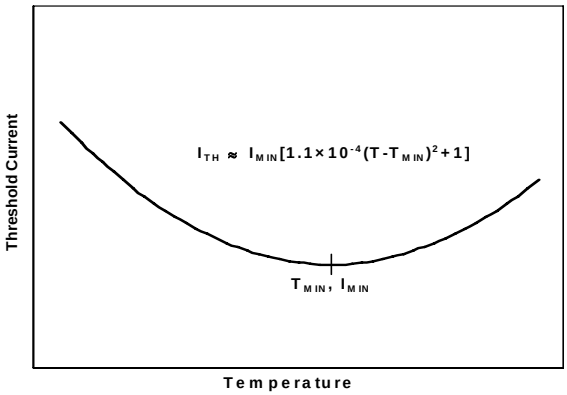
$$\text{Deltrk} = \frac{I_{PD}(P_O = 0.75\text{mW}) / 0.75\text{mW}}{I_{PD}(P_O = 0.45\text{mW}) / 0.45\text{mW}}$$

III. Typical Performance Curves

Emitted Power vs. Current: Power varies approximately linearly with current above threshold.



Threshold Current vs. Temperature: Threshold current varies parabolically with temperature; thus it can be nearly constant for a limited temperature range.



IV. Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Case Operating Temperature	T_{op}	-40		85	°C	
Storage Temperature	T_{sto}	-40		85	°C	

V. Regulatory Compliance

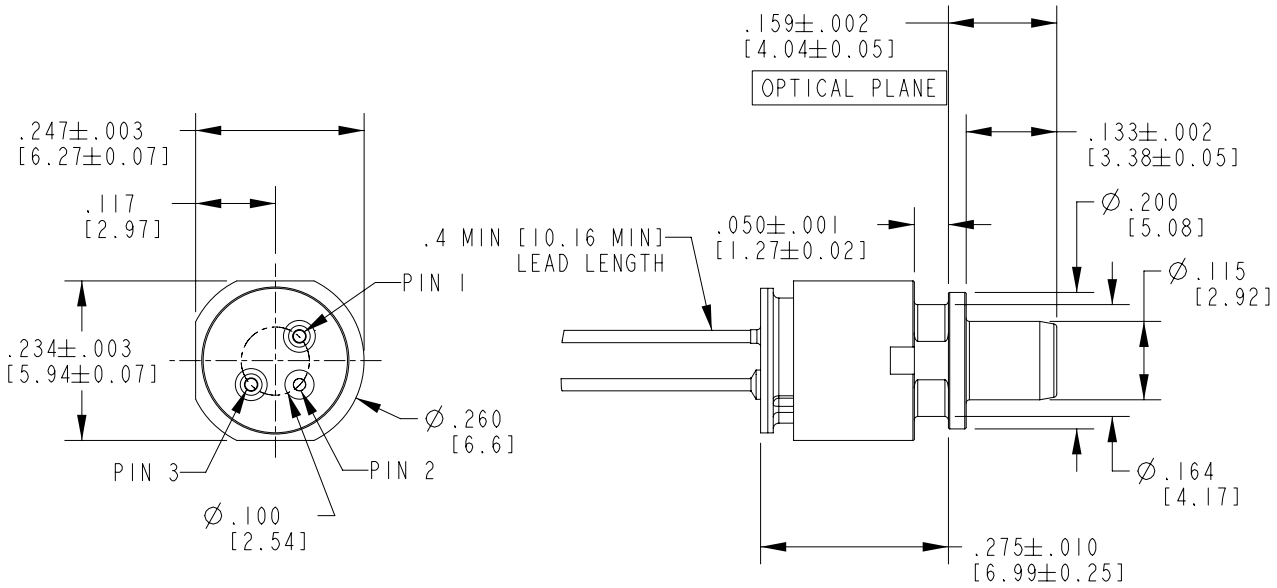
Feature	Agency	Standard	Certificate Number
Laser Eye Safety	FDA/CDRH	CDRH 21 CFR 1040 and Laser Notice 50	

Copies of the referenced certificates are available at Finisar Corporation upon request.

VI. Mechanical Specifications

HFE4190-441		HFE4191-441	
Number	**Function**	**Number**	**Function**
1	K_{LD}	1	A_{LD}
2	K_{PD}, A_{LD}	2	K_{LD}, A_{PD}
3	A_{PD}	3	K_{PD}

A_{LD}	VCSEL Anode	A_{PD}	Monitor Photodiode Anode
K_{LD}	VCSEL Cathode	K_{PD}	Monitor Photodiode Cathode



(dimensions are in inches [mm])

XI. Revision History

Revision	Date	Description
A1	4/13/2013	• Document created.

XII. For More Information

Finisar Corporation
1389 Moffett Park Drive
Sunnyvale, CA 94089-1133
Tel. 1-408-548-1000
Fax 1-408-541-6138
sales@finisar.com
www.finisar.com

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Laser Diodes ***category:***

Click to view products by Finisar ***manufacturer:***

Other Similar products are found below :

PLT5 520EA P PLT3 520D 905D1S03UA 905D1S09UA 905D1S3J03UA 905D1S3J09UA ADL-63054SL ADL-63301TL ADL-63V0ANP ADL-63V0BTP ADL-65055TL ADL-65074TA4 ADL-65074TL-1 ADL-65075SL ADL-65075TA4 ADL-66201TA4 ADL-66505TL ADL-66801TL ADL-78051TL ADL-78101TL ADL-83Z01TL ADL-83Z51TL ADL-85051TL ADL-85301TL ADL-85501TL PLT3 450C LCU632051A LCU670561A HFE4081-321 OPV315YBT PLT5 450B ADL-63102TL-3 ADL-63153TL ADL-66201TL LCU66A051A SPL LL90_3 ADL-65075TL DFB-1310-10LR-LCA HFE4192-582 FP-1310-5I-50SMF-FCAPC PL 450B PL 520_B1 PLPT5 450KA PLPT5 447KA PLPT9 450LA_E PLT5 488 PL 520_B1_2 PLT5 520_B1-3 PLT5 520B SPL PL90_3