

## Product Specification

### 1310nm FABRY-PEROT (FP) LASER DIODE, LC TOSA

#### FP-1310-4I-LCB, FP-1310-4I-LCC

#### PRODUCT FEATURES

- Wide operating temperature (-40°C to 85°C)
- Stable threshold current for easy transmitter control ( $T_0 \sim 80K$ )
- 1310 nm typical emission wavelength FP-LDs
- High-speed modulation capability (Up to 4Gb/s)
- Excellent reliability
  - Ultra-low gradual wear-out rates
  - <1% failures in 20 yrs at 55°C



The FP-1310-4I-LCx is an MOCVD grown InAlGaAs ridge laser diode with emission wavelength of 1310 nm and standard continuous light output of 5mW per facet. These lasers provide stable, single transverse mode oscillation.

These are hermetically sealed devices in a coaxial package (TO-56) with an integrated photodiode to monitor the optical output. Suitable as a light source in data-com and telecom applications with data rates up to 4 Gb/s.

#### PRODUCT SELECTION

Part Number	Description
FP-1310-4I-LCB	1310 nm Fabry-Perot (FP) Laser Diode, LC TOSA package
FP-1310-4I-LCC	1310 nm Fabry-Perot (FP) Laser Diode, LC TOSA package, low power.

**I. Absolute Maximum Ratings**

Parameter		Rating
Output Power, CW	FP-1310-4I-LCA	10mW
	FP-1310-4I-LCB	5mW
	FP1310-4I-LCC	2mW
	FP-1310-4I-SCC	
Reverse Voltage (laser diode)		2V
Reverse voltage (monitor photodiode)		10V
Forward current (photodiode)		1mA
Operating temperature		-40°C to +85°C
Storage temperature		-40°C to +100°C
ESD Exposure (Human Body Model)		200V

**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



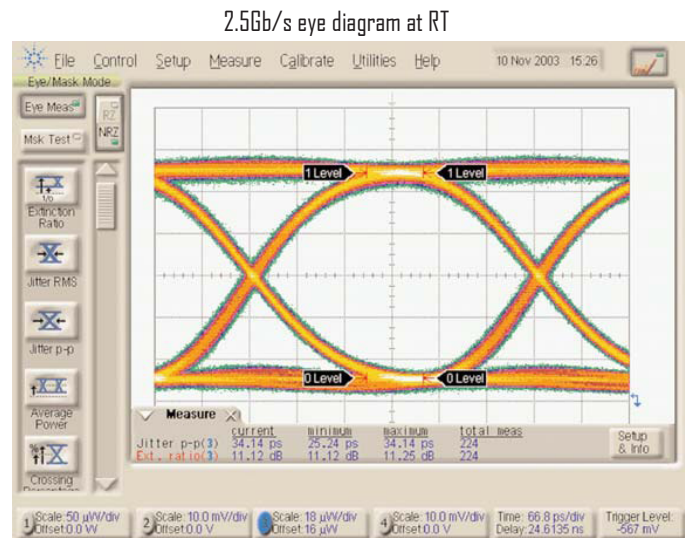
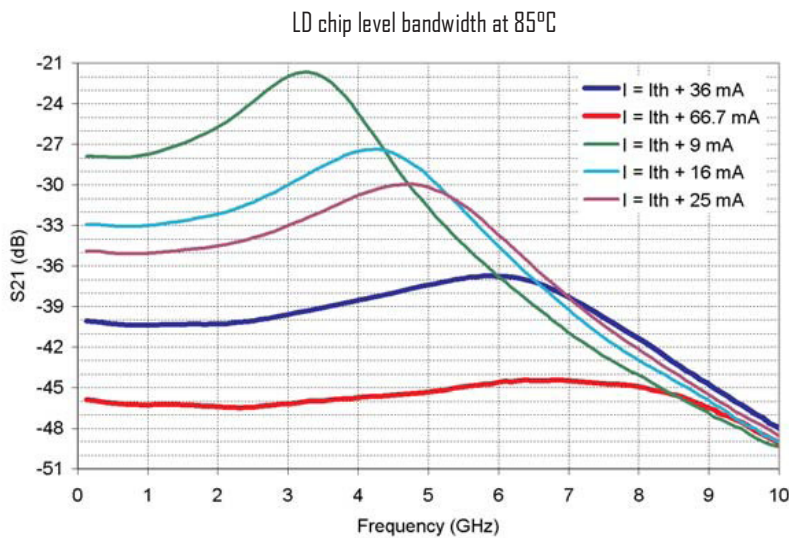
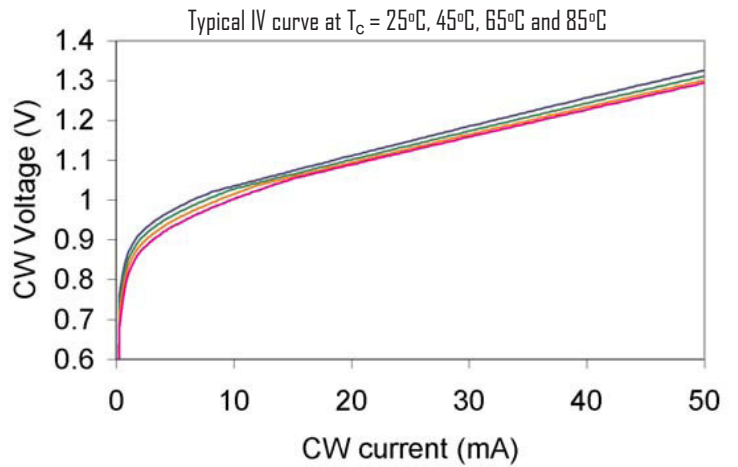
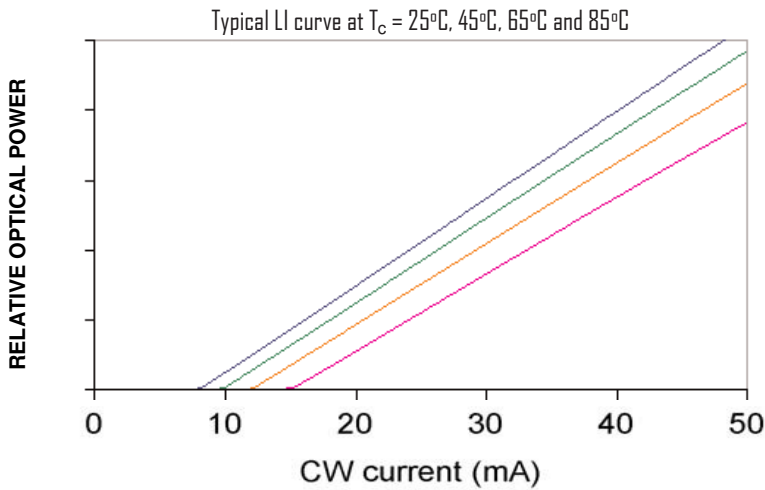
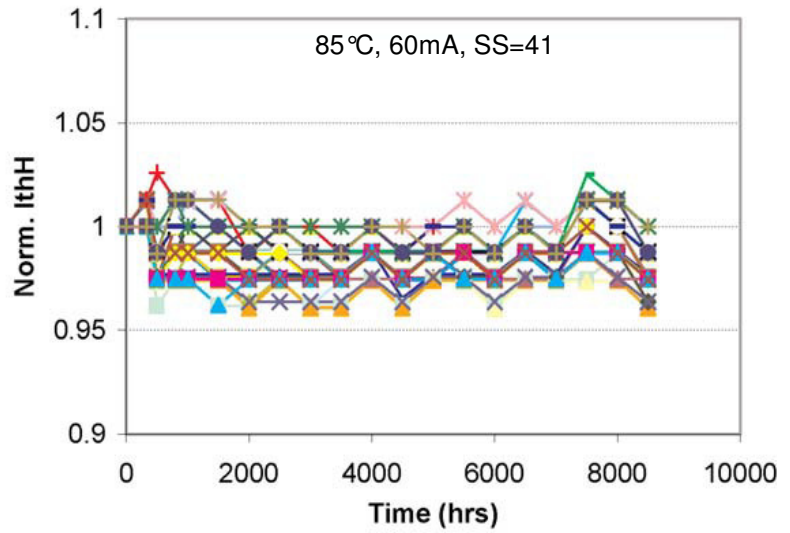
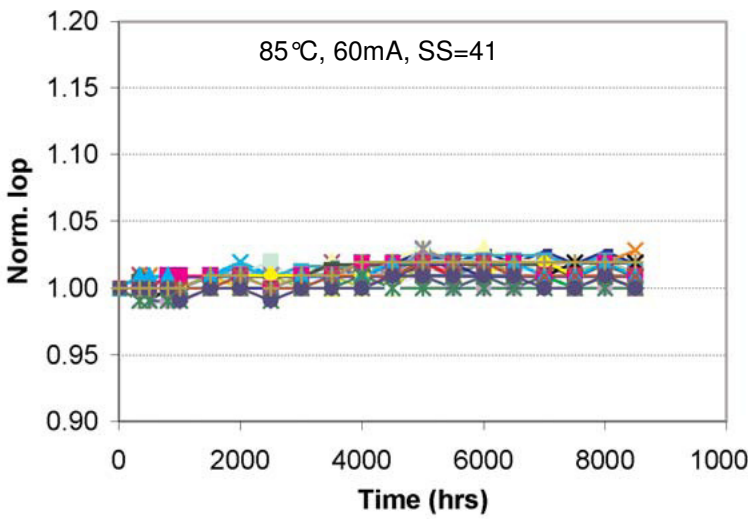
## II. Electro-Optical Characteristics ( $T_{CASE} = 25^{\circ}C$ unless otherwise stated)

Parameter		Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Optical Output Power	FP-1310-4I-LCB	$I_F = I_{OP}$	$P_0$	-4.0	-1.0	-0.5	dBm	1
	FP-1310-4I-LCC	$I_F = I_{OP}$		-6.5	-4.3	-3		
Slope Efficiency	FP-1310-4I-LCB	$T_c = 25^{\circ}C$	SE	0.02	0.03	0.04	W/A	2
	FP-1310-4I-LCC	$T_c = 25^{\circ}C$		0.009	0.016	0.024		
Operating Current		$T_c = 25^{\circ}C$	$I_{OP}$		32		mA	
Threshold Current		CW, $T_c = 25^{\circ}C$	$I_{TH}$	3	9	13	mA	
		CW, $T_c = 85^{\circ}C$	$I_{TH,85}$		21	30	mA	
Temperature dependence of threshold current			$T_0$		80		K	
Operating Voltage		CW voltage at $I_F = I_{OP}$	$V_{OP}$		1.15	1.4	V	
Differential series resistance (laser diode)		CW $dV/dI$ at $T=25^{\circ}C$	$R_{OP}$	4	7	12	$\Omega$	3
Slope efficiency ratio			SER	0.6	0.8	-		4
Lasing wavelength			$\lambda_c$	1290	1310	1330	nm	
Spectral width under modulation		PRBS 2 <sup>7</sup> -1, ER = 10 dB; $I_b = 1.8 \cdot I_{th}$ ; RMS (sigma)	$\Delta\lambda$		1.5	2.75	nm	5
Temperature dependence of lasing wavelength			$\Delta\lambda_c/\Delta T$	0.40	0.45	0.55	nm/C	
Rise time		20% - 80% ; $T_c = 85^{\circ}C$ ; ER = 10 dB; $I_b = 1.8 \cdot I_{th}$	$t_r$			140	ps	
Fall time		20% - 80% ; $T_c = 85^{\circ}C$ ; ER = 10 dB; $I_b = 1.8 \cdot I_{th}$	$t_f$			140	ps	
Relaxation oscillation frequency		$T_c = 85^{\circ}C$ ; $I = I_{th} + 36mA$	$f_R$		5.5		GHz	
Monitor photodiode capacitance			$C_d$		5		pF	
Tracking error			$\Delta_{TRACK}$	-1.5		+1.5	dB	6
Monitor photodiode dark current		$V_R = 3V$	$I_{m0}$	0		0.1	$\mu A$	
Monitor photodiode current	FP-1310-4I-LCB	$I_F = I_{op}$	$I_m$	30	130	800	$\mu A$	
	FP-1310-4I-LCC	$I_F = I_{OP}$		30	200	800		

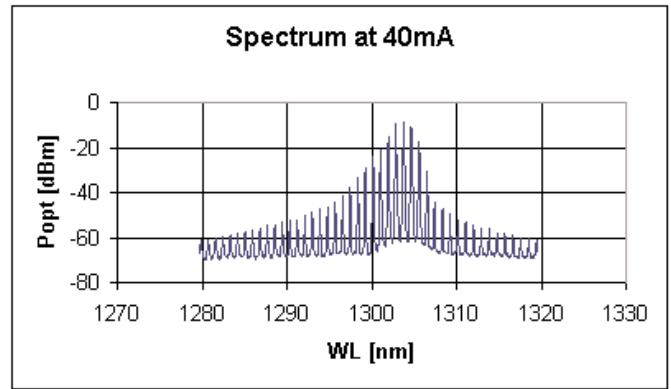
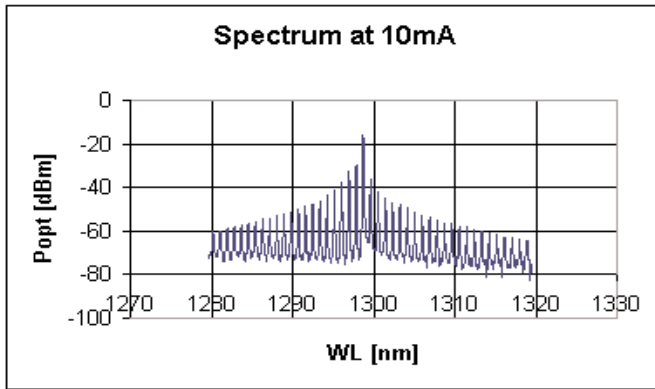
### Notes:

1. Output power is measured into a 9/125um single mode fiber
2. Slope Efficiency is measured between  $I_{TH} + 10mA$  and  $I_{TH} + 20mA$
3. Series resistance is measured between 15mA and 25mA
4. Slope Efficiency Ratio is defined as the ratio of  $SE_{85C}/SE_{25C}$
5. Spectral width is measured according to FOTP-127
6. Tracking error is defined as the change in fiber coupled optical power when the monitor current is held constant over the operating temperature range

### III. Typical Characteristics



**Typical Characteristics**



**IV. Environmental Specifications**

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Case Operating Temperature	T <sub>op</sub>	-40		85	°C	
Storage Temperature	T <sub>sto</sub>	-40		100	°C	

**V. Regulatory Compliance**

Feature	Agency	Standard	Certificate Number
Laser Eye Safety	FDA/CDRH	CDRH 21 CFR 1040 and Laser Notice 50	0820400

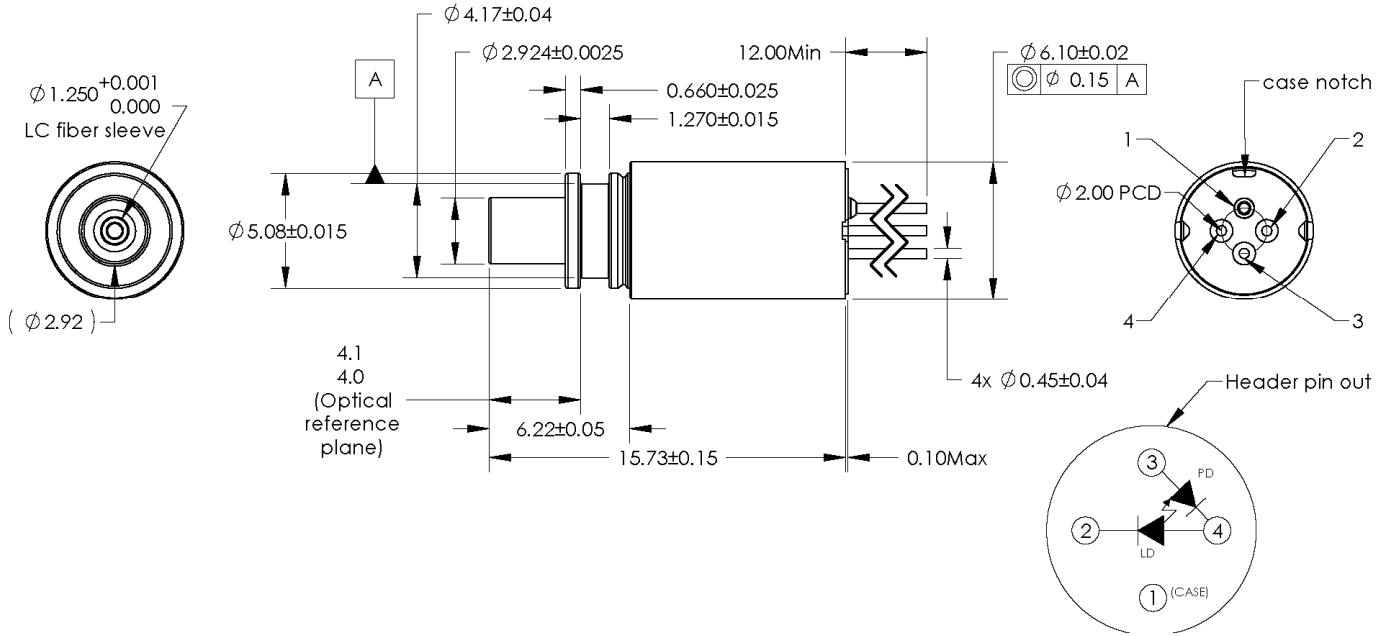
Copies of the referenced certificates are available at Finisar Corporation upon request.

**VI. Mechanical Specifications**

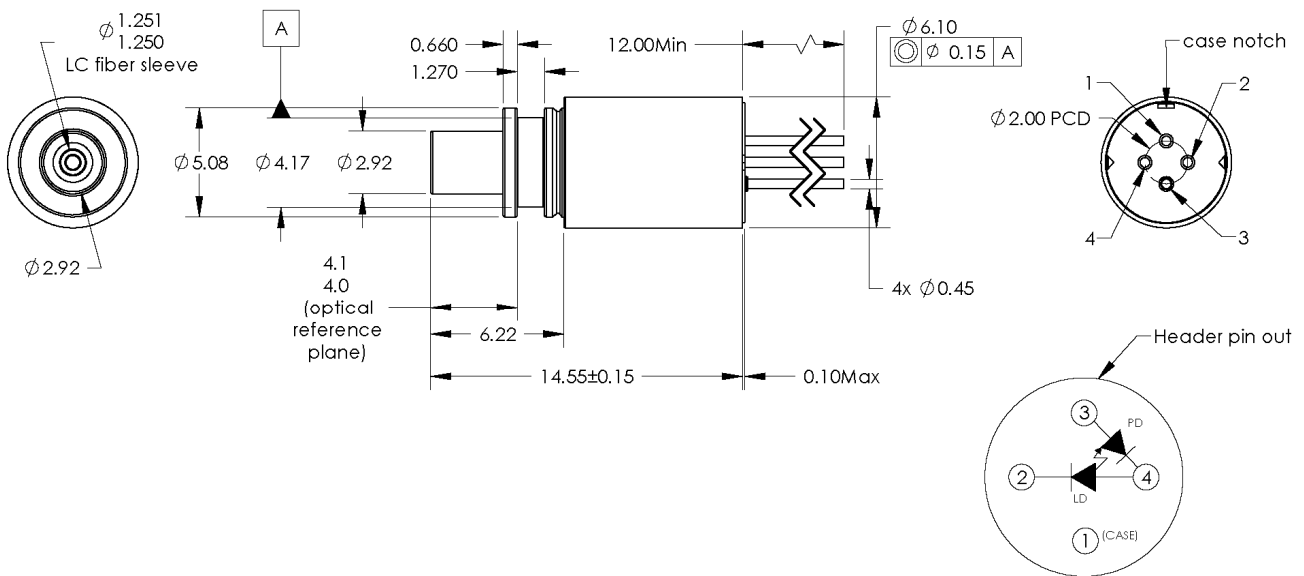
PIN	Description
1	Case (isolated)
2	LD Cathode
3	PD Anode
4	LD Cathode / PD Anode

(dimensions are in mm)

**FP-1310-4I-LCB**



**FP-1310-4I- LCC**



**VII. Revision History**

<b>Revision</b>	<b>Date</b>	<b>Description</b>
B00	10/8/2014	• Converted to Finisar Standard format

**VIII. For More Information**

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