Finisar

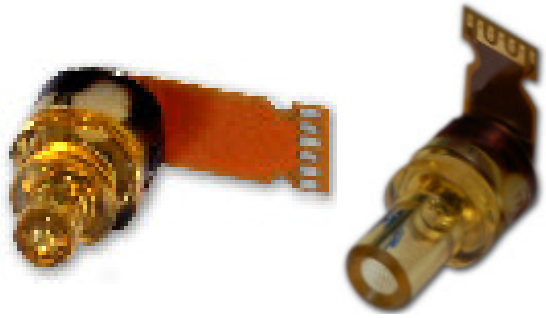
Product Specification

10Gbps 850nm VCSEL, LC and SC TOSA Package

HFE6x92-761

PRODUCT FEATURES

- High performance VCSEL
- Low electrical parasitic TO package with flexible interface
- Data rates from DC to 12.5Gbps
- Complete isolation between the VCSEL, Monitor Photodiode and Case
- Mechanically compatible with all 10Gbps MSAs



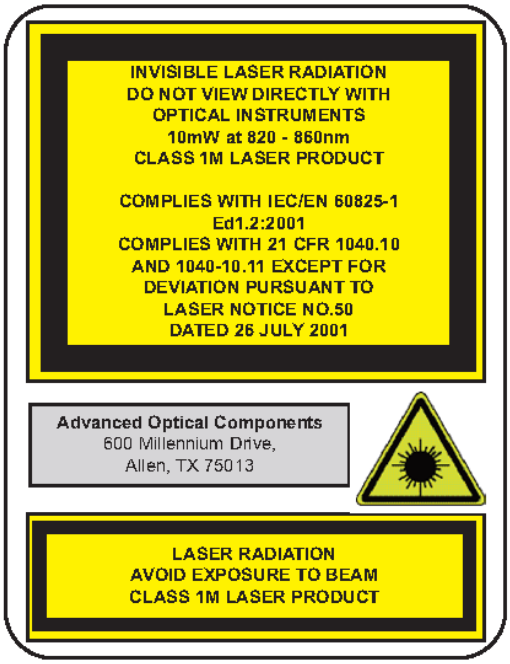
The HFE6x92-761 uses a high-performance Vertical Cavity Surface Emitting Laser (VCSEL) designed to meet performance requirements for 10Gbps data communication over multimode optical fiber. Applications include Ethernet, Fibre Channel and ATM protocols. The optical assembly is designed to inter-face either 50□m or 62.5□m multimode fiber and ensure launch conditioning requirements compatibility with enhanced bandwidth fiber as specified by TIA 455-203.
The HFE6x92-761 incorporates a power monitoring photodiode that can be used for temperature compensation, average power control, and for compliance with Class 1 eye safety limits.

PRODUCT SELECTION

Part Number	Description
HFE6192-761	Differentially Driven, attenuated, LC TOSA, with 50Ω flex
HFE6392-761	Differentially Driven, attenuated, SC TOSA, with 50Ω flex

I. Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-40 to +85°C
Case Operating Temperature	0* to +85°C
Lead Solder Temperature	260°C, 10 sec.
Reverse Power Supply Voltage	5V
Max continuous forward current	12mA
ESD Exposure (Human Body Model)	150V[1]



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_A =25C, unless otherwise stated)

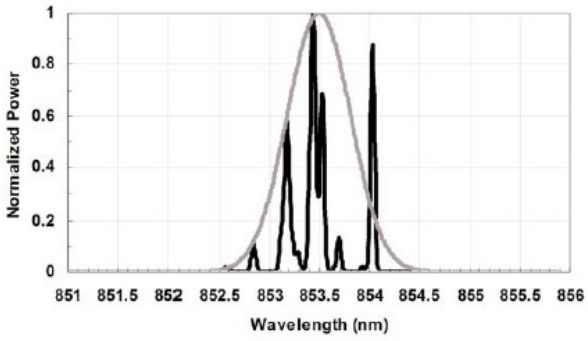
VCSEL Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Fiber coupled optical power	I_F = 6.5mA peak	P_{OC}	400	600		µW	
Coupling Efficiency	50/125µm fiber	PO_PCT	70			%	1
Threshold Current	I_F = 6.5mA	I_{TH}		1	2	mA	
Threshold Current Temperature Variation		ΔI_{TH}			1	mA	2
Slope Efficiency	T_A=0 to 70ºC	η	0.06	0.075	0.2	mW/mA	3
Slope Efficiency Temperature Variation	P_{OC}=0.6mW	$\Delta\eta/\Delta T$		-0.4		%/ºC	
Peak Wavelength	T_A=0 to 70ºC	λ_P	840		860	nm	
λ_P Temperature Variation	I_F=6.5mA	$\Delta\lambda_P/\Delta T$		0.06		nm/ºC	
RMS Spectral Bandwidth	T_A=0 to 70ºC	$\Delta\lambda$			0.4	nm	
Laser Forward Voltage	I_F=6.5mA	V_F	1.6	1.8	2.2	V	
Laser Reverse Voltage	I_F=6.5mA	V_R	5	10		V	
Rise/Fall Time	I_R =10µA	T_R T_F			40 40	ps	4
Relative Intensity Noise	Bias above threshold 20%-80%	RIN_{12}			-130	dB/Hz	5
Series Resistance	I_F=6.5mA	R	41	60	75	Ohms	
Series Resistance Temperature Variation	I_F=6.5mA	$\Delta R/\Delta T$		-0.2		%/ºC	
Total Capacitance	I_F=6.5mA	C_T			0.5	pF	6
Encircled Flux Diameter	I_F=6.5mA	EF					7
Photodiode Parameters	**Test Condition**	**Symbol**	**Min.**	**Typ.**	**Max.**	**Units**	**Notes**
Monitor Current	P_{OC}=0.6mW, VR=3V	I_{PD}	50	150	300	µA	
Monitor Current Temperature Variation	P_{OC}=0.6mW T_A=0 to 70ºC	$\Delta I_{PD}/\Delta T$		0.0		%/ºC	
Tracking Ratio Variation (Open Bore)	P_{OB}=-2.5dBm T_A=0 to 70ºC	ΔTR	-0.5		+0.5	dB	
Dark Current	P_{OC}=0mW, V_R=3V	I_{DARK}			20	nA	
PD Reverse Voltage	P_{OC}=0mW, I_R=10uA	BVR_{PD}	30	115		V	8
PD Capacitance	V_R =0V, Freq=1MHz V_R =3V, Freq=1MHz	C_{PD}		75 40	100 55	pF	

Notes:

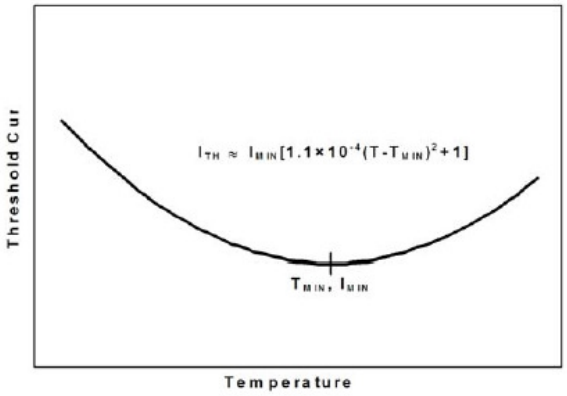
1. PO_PCT is defined as the ratio of the coupled power into a 50/125 micron fiber to the total power output from the optical front end as measured on a large area detector.
2. Operation outside of the specified range may result in the threshold current exceeding the maximums defined in the electro-optical characteristics table. DITH is the maximum deviation from the 25ºC value.
3. Slope efficiency is defined as ΔPO/ΔIF at a total power output of 0.6mW. Slope efficiency is intentionally lowered to the value shown by attenuation.
4. Rise and fall times are sensitive to drive electronics. Rise and fall times are measured 20%-80% using a 1GHz square wave AC coupled to the VCSEL using a bias-T.
   The DC current is adjusted to achieve a minimum OMA of -4dBm. Corrections are made for finite detector bandwidth.
5. RIN12 is measured using the OMA technique with 12dB return.
6. Total capacitance is measured with the VCSEL forward biased using a Network analyzer at 1GHz.
7. Encircled flux is measured per TIA-455-203.
8. To prevent VCSEL damage, short the VCSEL anode and cathode during BVR testing

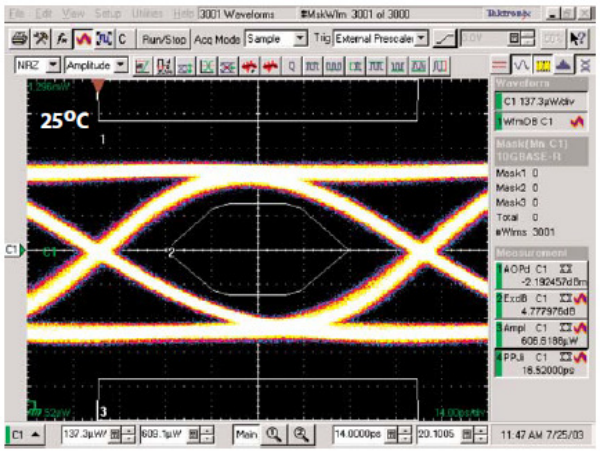
III. Typical Performance Curves

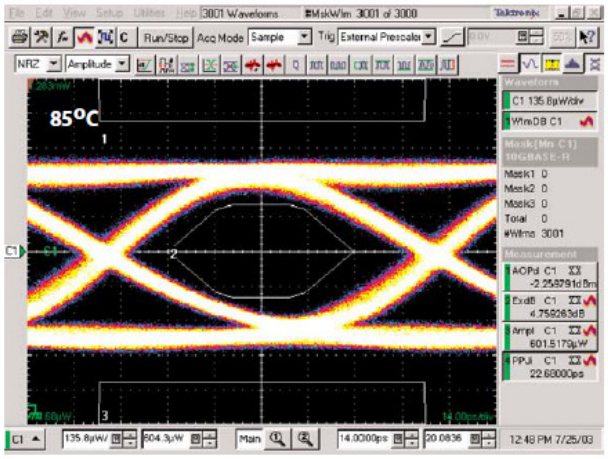
RMS Spectral Width is defined and measured using TIA-455-127



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}	0		85	°C	
Storage Temperature	T_{sto}	-40		85	°C	

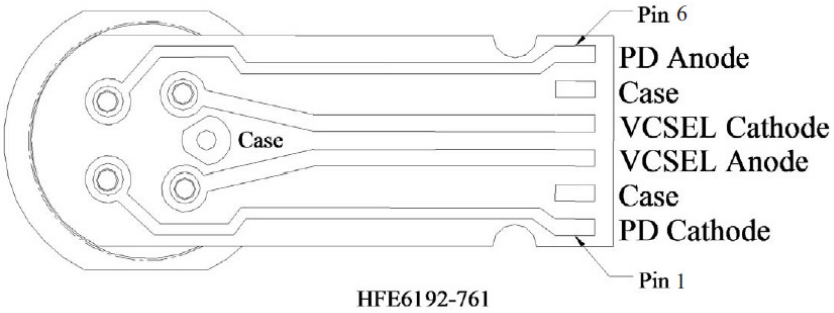
V. Regulatory Compliance

Feature	Agency	Standard	Certificate Number
Laser Eye Safety	FDA/CDRH	CDRH 21 CFR 1040 and Laser Notice 50	9521487

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

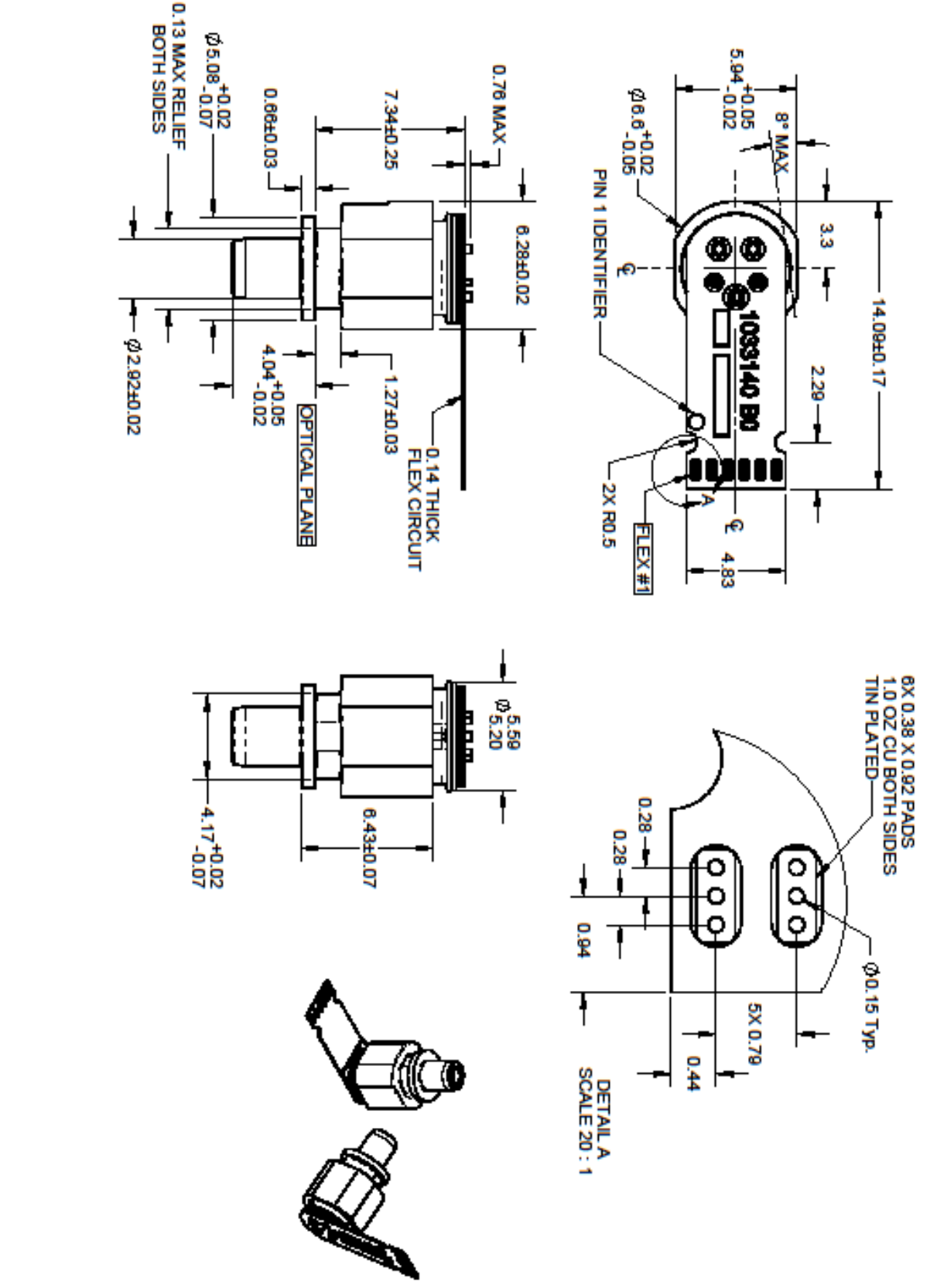
VI. Mechanical Specifications

PIN	Description
1	PDK
2	GND
3	LDA
4	LDK
5	GND
6	PDA

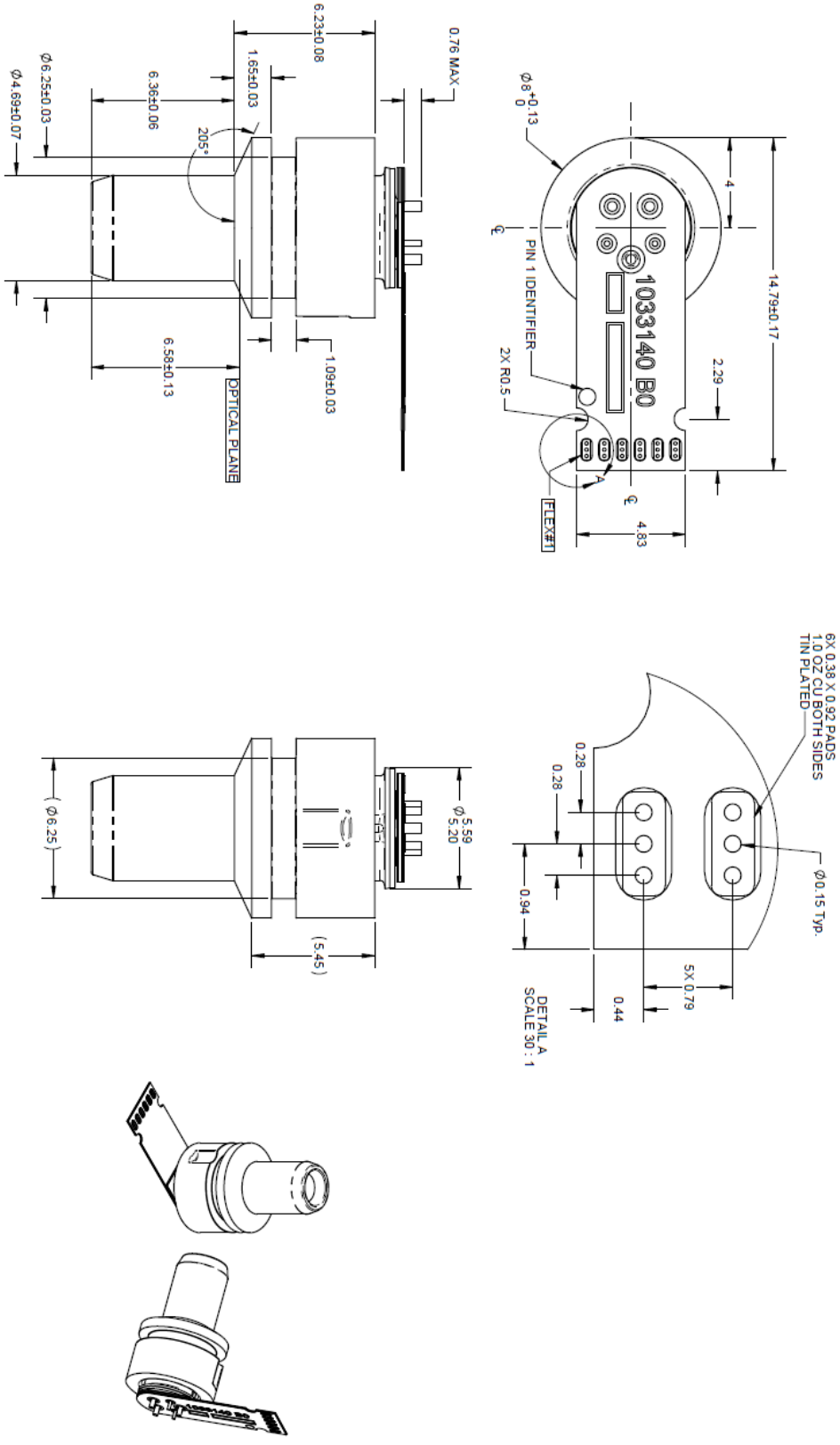


HFE6192-761

LC TOSA
All dimensions in mm



SC TOSA
All dimensions in mm



VII. Revision History

Revision	Date	Description
B00	8/14/2014	• Changed to Finisar format
B01	12/3/2014	• Changed limits for Vf and SE (Vf max reduced to 2.2V and SE min raised to 0.06)

VIII. For More Information

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