DATA SHEET

1310NM FABRY-PEROT (FP) LASER DIODE LC OR SC PACKAGE

FP-1310-4I-XXX

FEATURES:

- Wide operating temperature (-40°C to 85°C)
- Stable threshold current for easy transmitter control (T_0 ~ 80K)
- 1310 nm typical emission wavelength FP-LDs
- Metal LC and SC package options
- 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-xxx is an MOCVD grown InAlGaAs ridge laser diode with emission wave-length 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.

Available in three output power options and a choice of LC and SC metal TOSA package.

FP-1310-4I-LCA
FP-1310-4I-LCB
FP-1310-4I-LCC

FP-1310-4I-SCC

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

Finisar
Advanced Optical Components Division

ABSOLUTE MAXIMUM RATINGS

Parameter		Rating
Output Power, CW	FP-1310-4I-LCA	10mW
	FP-1310-4I-LCB	5mW
	FP1310-4I-LCC FP-1310-4I-SCC	2mW
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.

FP ELECTRO-OPTICAL CHARACTERISTICS

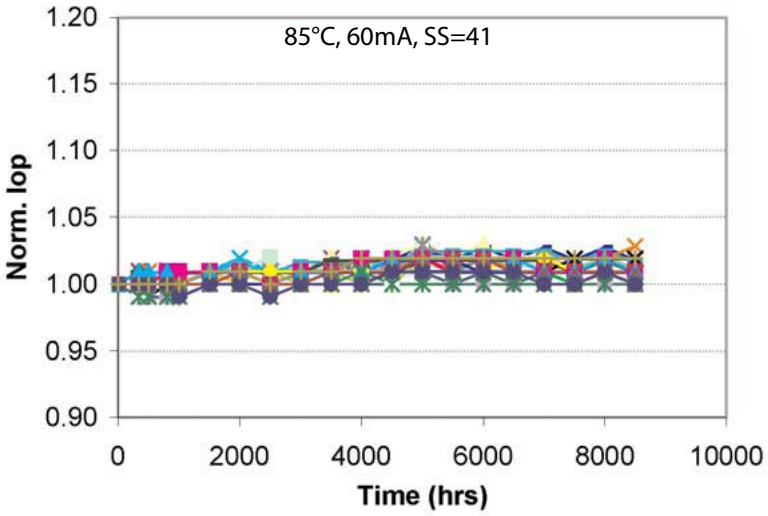
T_{CASE} =25°C unless otherwise stated

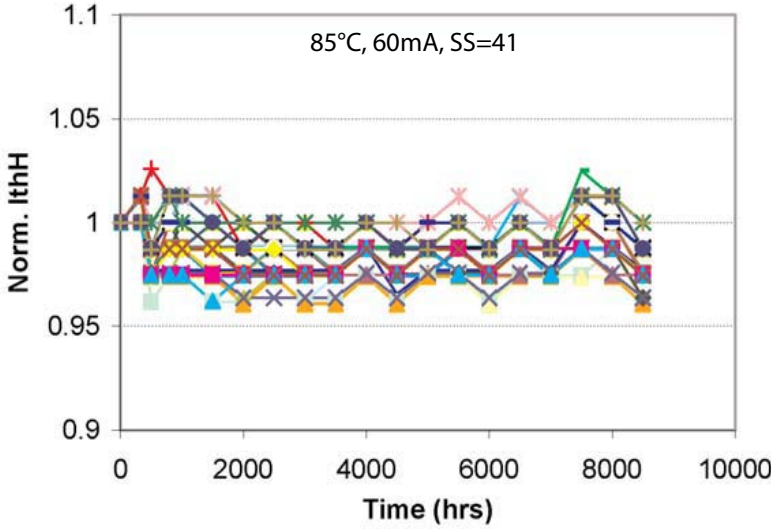
Parameter		Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Optical Output Power	FP-1310-4I-LCA	$I_F = I_{OP}$	P_O	2	4	6	dBm	1
	FP-1310-4I-LCB	$I_F = I_{OP}$		-4.0	-1.0	-0.5		
	FP-1310-4I-LCC FP-1310-4I-SCC	$I_F = I_{OP}$		-6.5	-4.3	-3		
Slope Efficiency	FP-1310-4I-LCA	T_c = 25°C	SE	0.07	0.1	0.19	W/A	2
	FP-1310-4I-LCB	T_c = 25°C		0.02	0.03	0.04		
	FP-1310-4I-LCC FP-1310-4I-SCC	T_c = 25°C		0.009	0.016	0.024		
Operating Current		T_c = 25°C	I_{OP}		32		mA	
Threshold Current		CW, T_c = 25°C	I_{TH}	3	9	13	mA	
		CW, T_c = 85°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°C	R_{OP}	4	7	12	Ω	3
Slope efficiency ratio			SER	0.6	0.8	-		4
Lasing wavelength			λc	1290	1310	1330	nm	
Spectral width under modulation		PRBS 2^7-1, ER =10 dB; Ib = 1.8*I_{th}; RMS (sigma)	Δλ		1.5	2.75	nm	5
Temperature dependence of lasing wavelength			Δλc/ΔT	0.40	0.45	0.55	nm/C	
Rise time		20% - 80% ; Tc = 85°C; ER = 10 dB; Ib = 1.8*I_{th}	t_r			140	ps	
Fall time		20% - 80% ; Tc = 85°C; ER = 10 dB; Ib = 1.8*I_{th}	t_f			140	ps	
Relaxation oscillation frequency		Tc = 85°C; I = I_{th}+36mA	f_R		5.5		GHz	
Monitor photodiode capacitance			C_d		5		pF	
Tracking error			Δ_{TRACK}	-1.5		+1.5	dB	6
Monitor photodiode dark current		V_R = 3V	I_{m0}	0		0.1	μA	
Monitor photodiode current	FP-1310-4I-LCA	$I_F = I_{op}$	I_m	30	130	800	μA	
	FP-1310-4I-LCB	$I_F = I_{op}$		30	130	800		
	FP-1310-4I-LCC FP-1310-4I-SCC	$I_F = I_{OP}$		30	139	200		

NOTES:

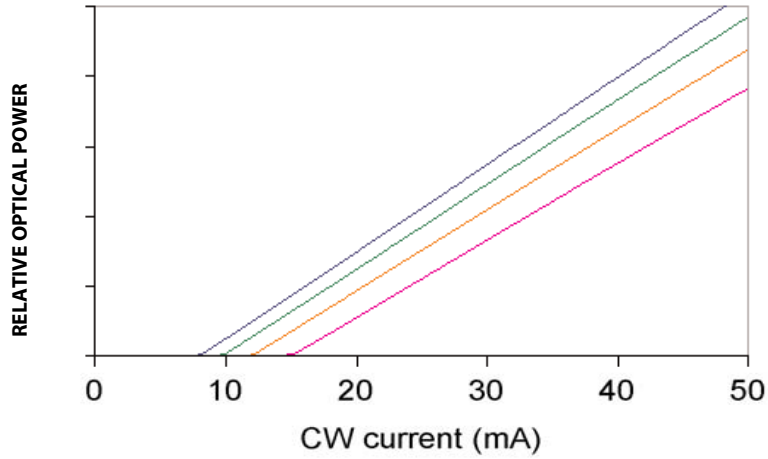
1. Output power is measured into a 9/125um single mode fiber
2. Slope Efficiency is measured between I_{TH}+10mA and I_{TH}+20mA
3. Series resistance is measured between 15mA and 25mA
4. .Slope Efficiency Ratio is defined as the ratio of SE_{85C}/SE_{25C}
5. Spectral width is measured according to FOTP-127
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

TYPICAL CHARACTERISTICS

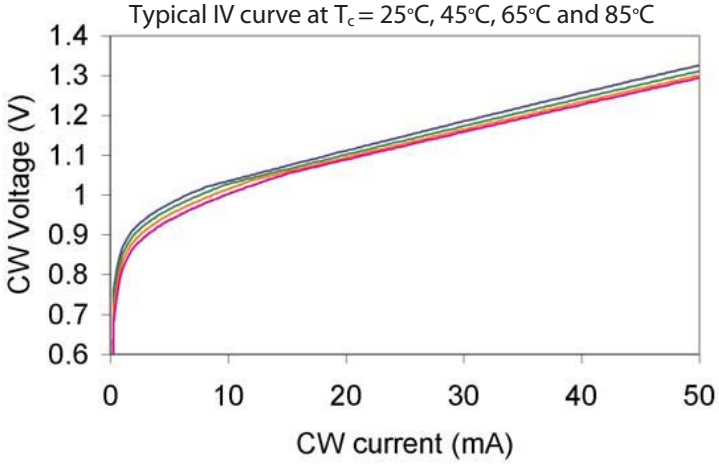




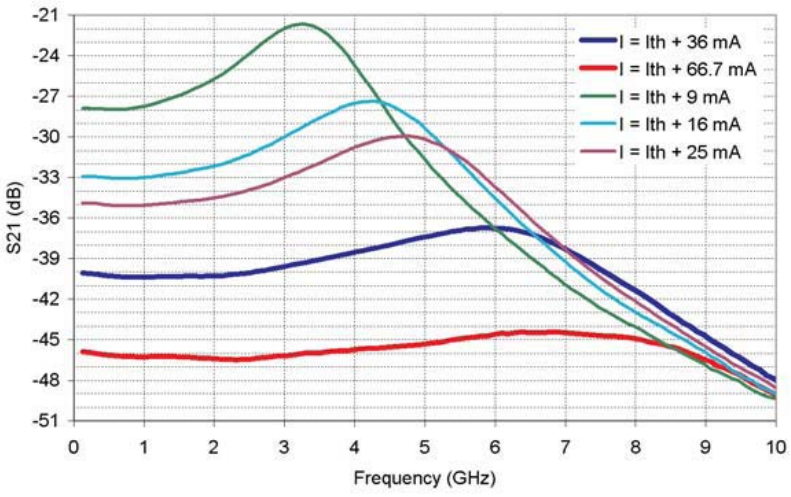
Typical LI curve at T_c = 25°C, 45°C, 65°C and 85°C



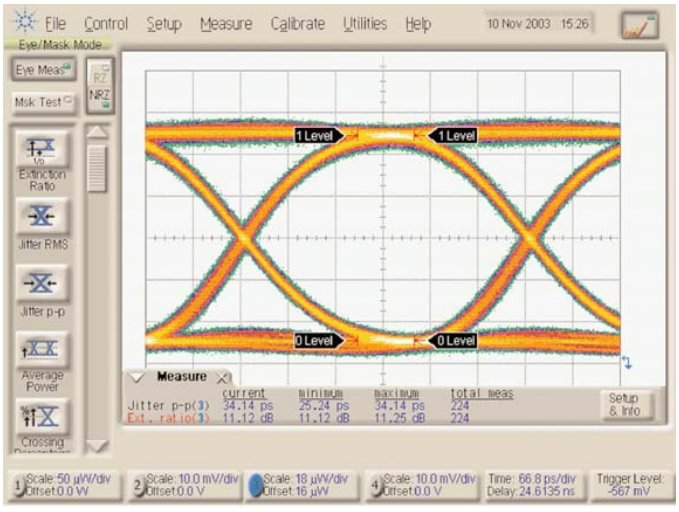
Typical IV curve at T_c = 25°C, 45°C, 65°C and 85°C



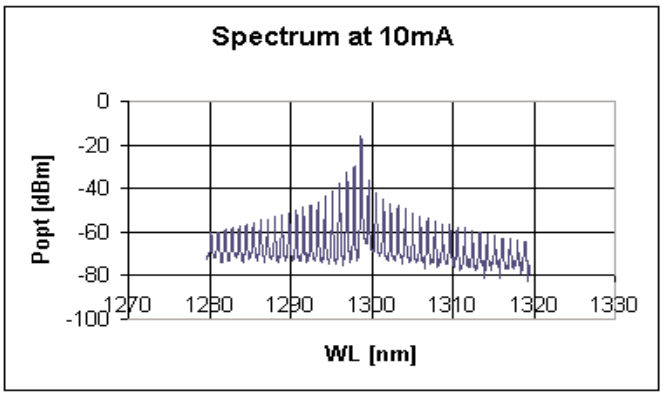
LD chip level bandwidth at 85°C

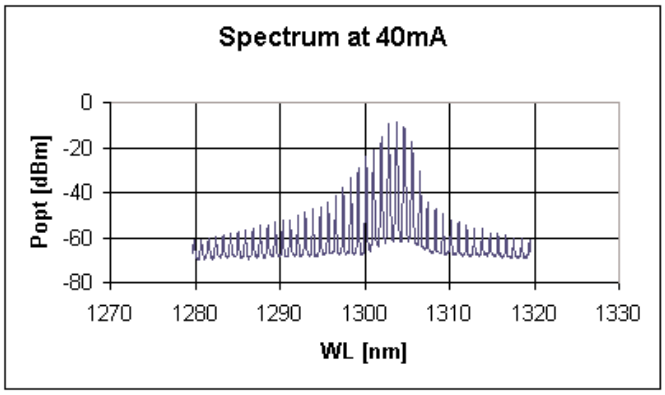


2.5Gb/s eye diagram at RT



TYPICAL CHARACTERISTICS





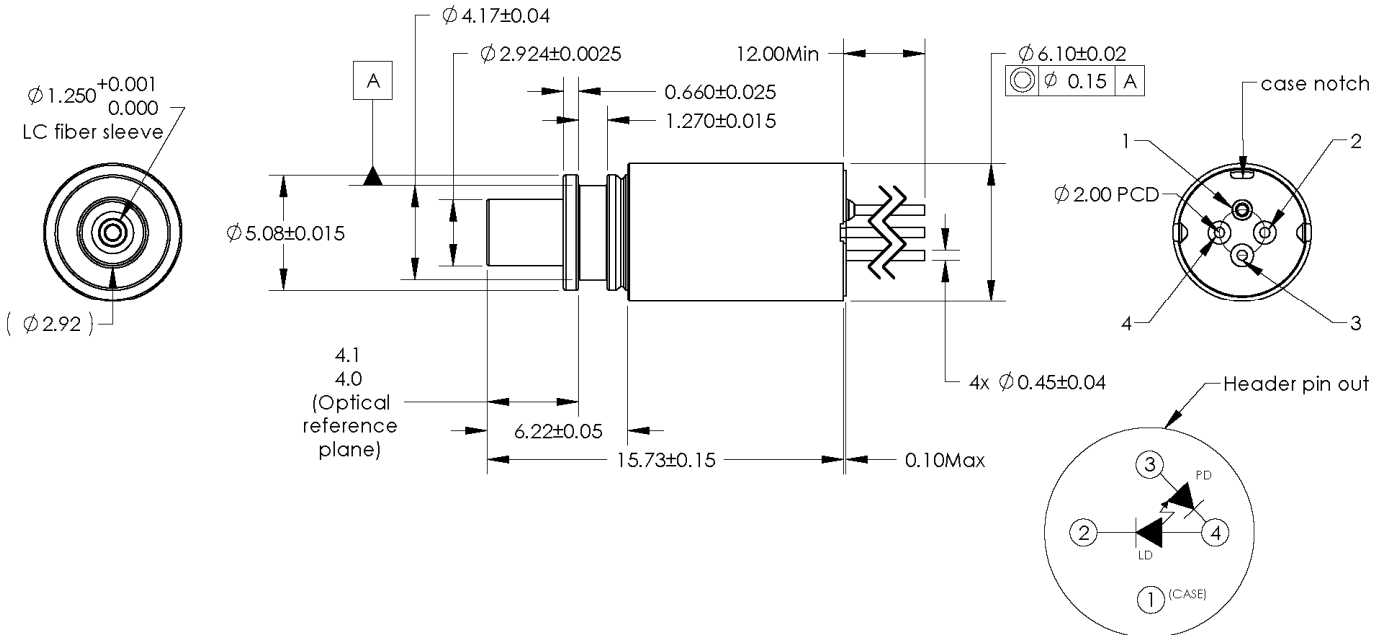
PIN OUT

Pin	Function
1	Case (isolated)
2	LD Cathode
3	PD Anode
4	LD Cathode / PD Anode

MOUNTING DIMENSIONS

For reference only. All dimensions in mm.

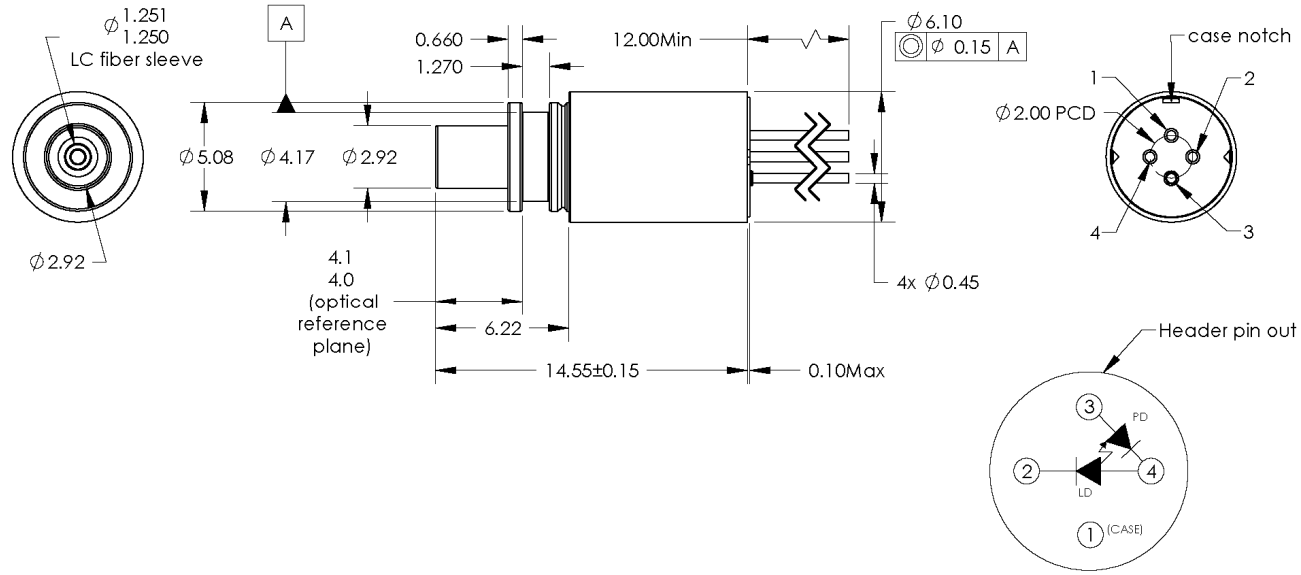
FP-1310-4I- LCA, FP-1310-4I-LCB



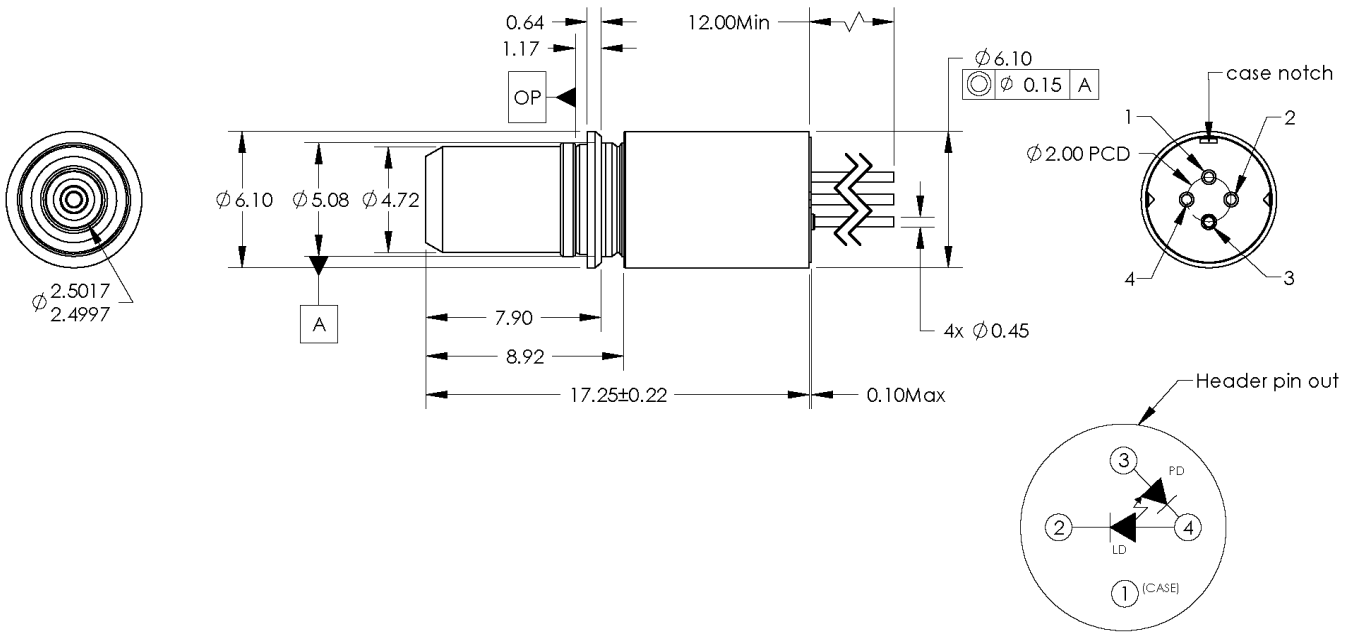
MOUNTING DIMENSIONS

For reference only. All dimensions in mm.

FP-1310-4I- LCC



FP-1310-4I- SCC



ADVANCED OPTICAL COMPONENTS

Finisar's ADVANCED OPTICAL COMPONENTS division was formed through strategic acquisition of key optical component suppliers. The company has led the industry in high volume Vertical Cavity Surface Emitting Laser (VCSEL) and associated detector technology since 1996. VCSELs have become the primary laser source for optical data communication, and are rapidly expanding into a wide variety of sensor applications. VCSELs' superior reliability, low drive current, high coupled power, narrow and circularly symmetric beam and versatile packaging options (including arrays) are enabling solutions not possible with other optical technologies. ADVANCED OPTICAL COMPONENTS is also a key supplier of Fabrey-Perot (FP) and Distributed Feedback (DFB) Lasers, and Optical Isolators (OI) for use in single mode fiber data and telecommunications networks

LOCATION

- Allen, TX - Business unit headquarters, VCSEL wafer growth, wafer fabrication and TO package assembly.
- Fremont, CA – Wafer growth and fabrication of 1310 to 1550nm FP and DFB lasers.
- Shanghai, PRC – Optical passives assembly, including optical isolators and splitters.

SALES AND SERVICE

Finisar's ADVANCED OPTICAL COMPONENTS division serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact a nearby sales office or call the number listed below.

AOC CAPABILITIES

ADVANCED OPTICAL COMPONENTS' advanced capabilities include:

- 1, 2, 4, 8, and 10Gbps serial VCSEL solutions
- 1, 2, 4, 8, and 10Gbps serial SW DETECTOR solutions VCSEL and detector arrays
- 1, 2, 4, 8, and 10Gbps FP and DFB solutions at 1310 and 1550nm
- 1, 2, 4, 8, and 10Gbps serial LW DETECTOR solutions
- Optical Isolators from 1260 to 1600nm range
- Laser packaging in TO46, TO56, and Optical subassemblies with SC, LC, and MU interfaces for communication networks
- VCSELs operating at 670nm, 780nm, 980nm, and 1310nm in development
- Sensor packages include surface mount, various plastics, chip on board, chipscale packages, etc. Custom packaging options

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