DATA SHEET

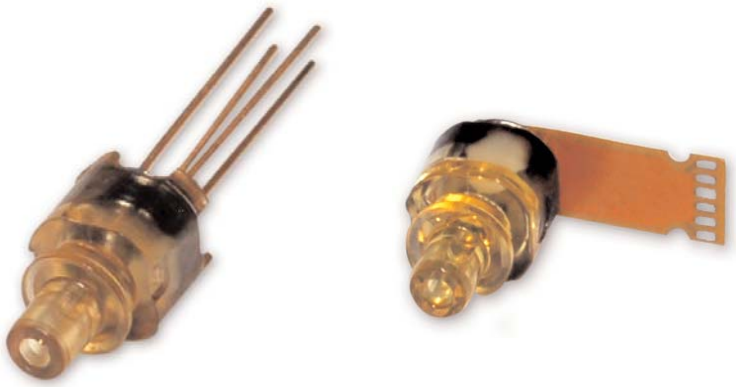
8 GBPS 850NM ROSA LINEAR APPLICATIONS LC ROSA PACKAGE

HFD7181-XXX

FEATURES:

- LC ROSA HFD7181-413 includes flex circuit
- LC ROSA HFD7181-001 leaded package
- Linear output Transimpedance Amplifier with large dynamic range
- High performance GaAs PIN photodiode
- Low electrical parasitic TO46 package
- Data rates up to 8.5Gbps
- Separate PD supply for power monitoring
- Low power dissipation
- Interface directly to EDC circuit
- Automatic Gain Control

The HFD7181-xxx uses a high-performance GaAs PIN photo-detector packaged with a transimpedance amplifier designed to meet performance requirements for 8Gbps data communication over multi-mode optical fiber at 850nm. Applications include Ethernet, Fiber Channel and ATM protocols. The optical assembly is designed to interface either 50µm or 62.5µm multi-mode fiber.



Part Number	Description
HFD7181-001	LC ROSA
HFD7181-413	LC ROSA, with flex

Finisar
Advanced Optical Components Division

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating
Storage temperature	-40^{O}C to +85^{O}C
Case Operating temperature	-20^{O} to +85^{O}C
Lead solder temperature	260^{O}C, 10 seconds
Power Supply Voltage	-0.3V to 3.6V
PIN Voltage	10V
Incident Optical Power	+3 dBm average, +5 dBm peak

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.

ELECTRICAL-OPTICAL CHARACTERISTICS

Vcc = 3.3V, AC coupled to 50 ohm (100 ohm differential), -20°C<T<85°C unless otherwise specified

Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Data Rate		DR			8.5	Gbps	1
Input Optical Wavelength		λp	830	850	860	nm	
Overload Power		P_{OVLD} (Avg)	+1.5	+3		dBm	
		P_{OVLD} (OMA)	+2.5	+4			
TIA Supply Voltage		V_{CC}	3.0	3.3	3.6	V	
TIA Supply Current	P_R=0µW, R_L=50 Ω AC coupled	I_{CC}		42	55	mA	2
PD Responsivity	P_R=-10dBm	Resp	0.4	0.5	0.6	A/W	2
PD Bias Voltage		V_{PD}	3.0	3.3	3.6	V	
Optical Return Loss	P_R=-10dBm	ORL	12			dB	2
Differential Output Voltage Swing	$P_{R,OMA}$=-10dBm R_L=100 Ω AC coupled	V_o (pk-pk)		50		mV	2,3,4
Differential Conversion Gain	$P_{R,OMA}$=-10dBm R_L=100 Ω AC coupled	CG_{DIFF}		1000		mV	2,3,4
-3dB Optical/Electrical Bandwidth	T_A=25°C	BW	6.5	7.5	9	GHz	2,3,5
Low Frequency –3dB Cutoff		BW_{LF}			30	KHz	2,3,5
Differential Crossing Point	$P_{R,OMA}$=-10dBm	CP_{DIFF}	45		55	%	
Output Impedance (single ended)	T_A=25°C	Z_{out}	42	50	58	Ω	
Sensitivity, OMA	DR = 8.5Gbps	S			-12	dBm	6,10
Sensitivity, OMA	DR = 8.5Gbps	$S_{STRESSED}$			-8	dBm	7,10,11
Rise/Fall Time	$P_{R\ OMA}$ =-10dBm, (20%-80%)	T_R/T_F		70		ps	3,8
Differential Electrical Return Loss	0 to 6GHz	S22	10			dB	
Group Delay	100MHz to 6GHz	GVD	-70		70	ps	
Power Supply Rejection Ratio	P_R=0µW (dark) F=1000MHz	PSRR	27	30		dB	2,9
pk-pk Jitter	$P_{R,OMA}$=-10dBm	J_{pk-pk}			45	ps	11
Total Harmonic Distortion	$P_{R,OMA}$=-16dBm, F=1GHz	THD		2	5	%	12
	$P_{R,OMA}$=+1dBm, F=1GHz			4	10		
Differential Gain Ripple	F=100MHz to 6GHz	ΔS_{21}			3	dB	

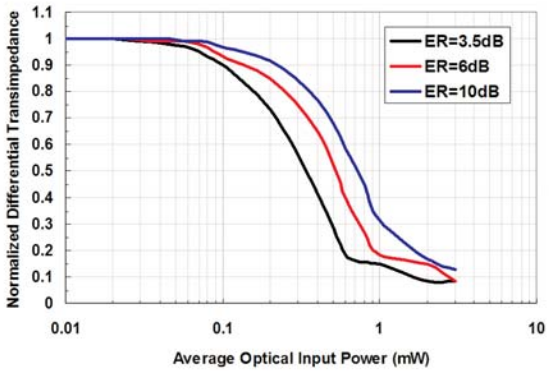
NOTES

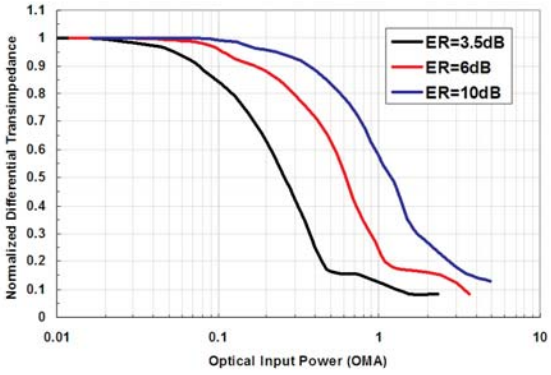
1. The data rate can be increased to 10.7Gbps for Fibre Channel applications with minimal degradation in performance.
2. P_R is the average optical power at the fiber face.
3. $P_{R,OMA}$ is the peak to peak optical power at the fiber face (Optical Modulation Amplitude) Measured with 2^{31} PRBS at 10.3 Gbps.

$$P_{R,OMA} \equiv \frac{2P_R(ER-1)}{ER+1}$$

where ER is the extinction ratio (linear) of the optical source.

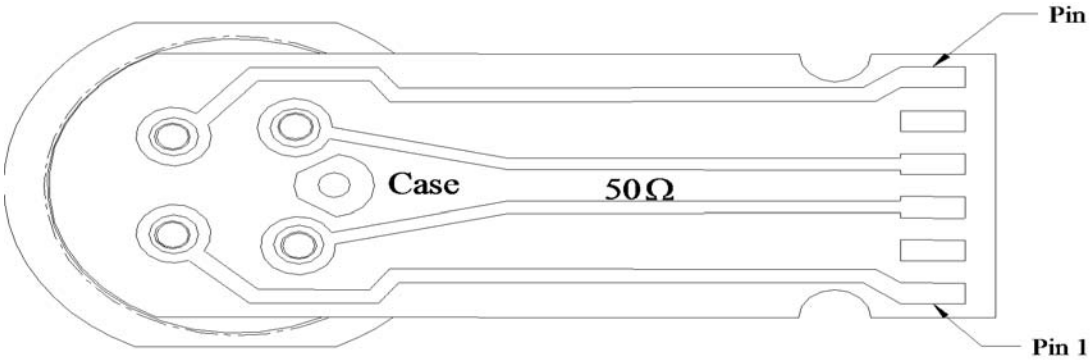
4. The TIA incorporates automatic gain control, which maintains approximately 300mV differential electrical output over the entire operating range. Refer to the chart below for typical differential transimpedance as a function of both average optical power and optical modulation amplitude.
5. Bandwidth and Low Frequency Cutoff are measured with a small signal sinusoidal light source with –8dBm average power.
6. Sensitivity is measured with an optical source with an extinction ratio of 3dB, at a bit rate of 8.5Gbps with BER=1E-12. For 10.57 Gbps, the sensitivity is degraded by approximately 1dB.
7. Stressed receiver sensitivity is measured per ANSI X3.T11 FC-PI-4 (8Gbps Fibre Channel) requirements.
8. Rise/Fall times are corrected for optical source Rise/Fall times. The corrected value is calculated as the square root of the difference of the squares of the measured differential detector output and the source
9. Value shown is with external power supply filtering.
10. For best sensitivity, a CDR that incorporates EDC may be required.
11. With an ANSI X3.T11 FC-PI-4 specified input stressed eye (see note 8)
12. Harmonic distortion is defined as the ratio of power in all harmonic frequencies divided by the power in the fundamental frequency
13. The electrical performance of the ROSA is dependent upon the quality of the electrical connection between the TO can and the circuit board. AOC cannot guarantee all performance specifications for parts without the flex circuit attached.

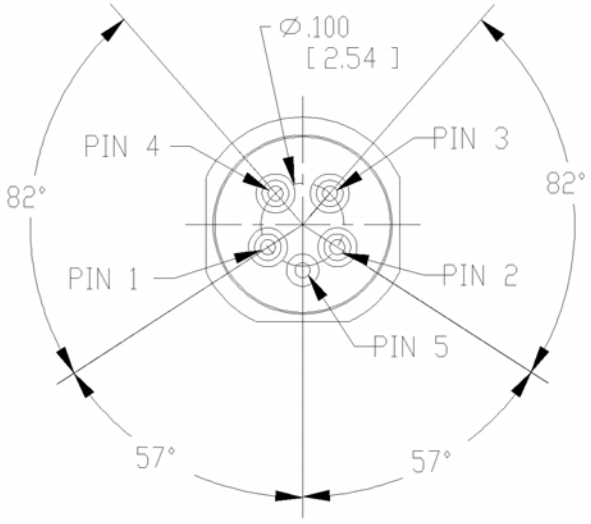




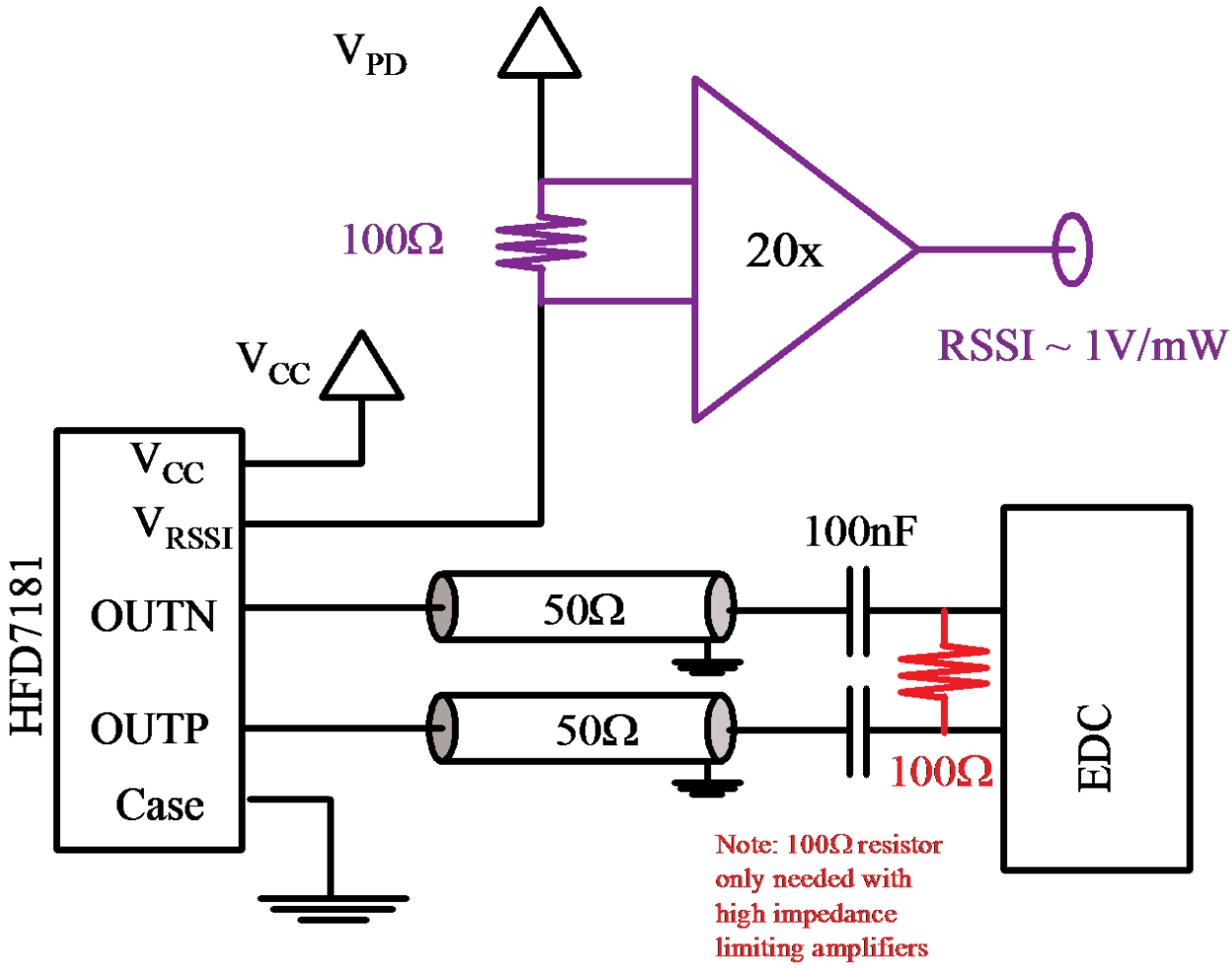
PINOUT

HFD7181-001		HFD7181-413	
Number	**Function**	**Number**	**Function**
1	OUTN	1	Vcc
2	OUTP	2	CASE
3	Vpd	3	OUTN
4	Vcc	4	OUTP
5	GND (Case)	5	CASE
		6	PD Bias

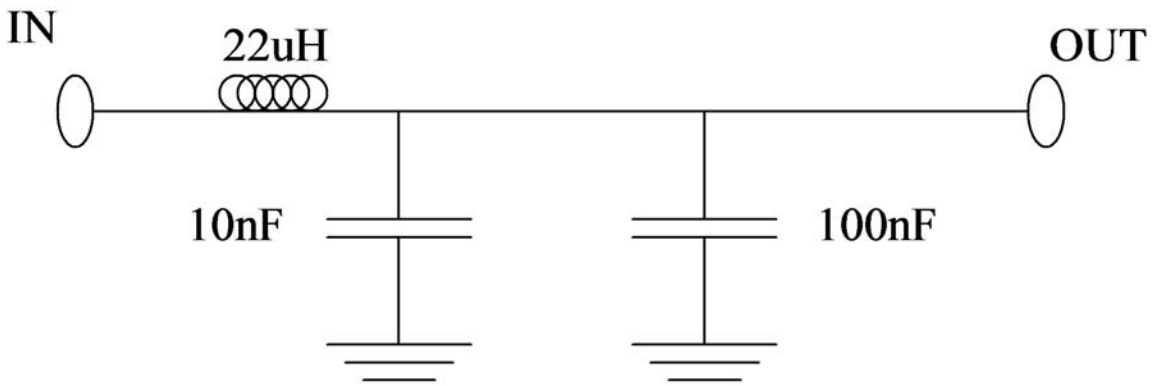




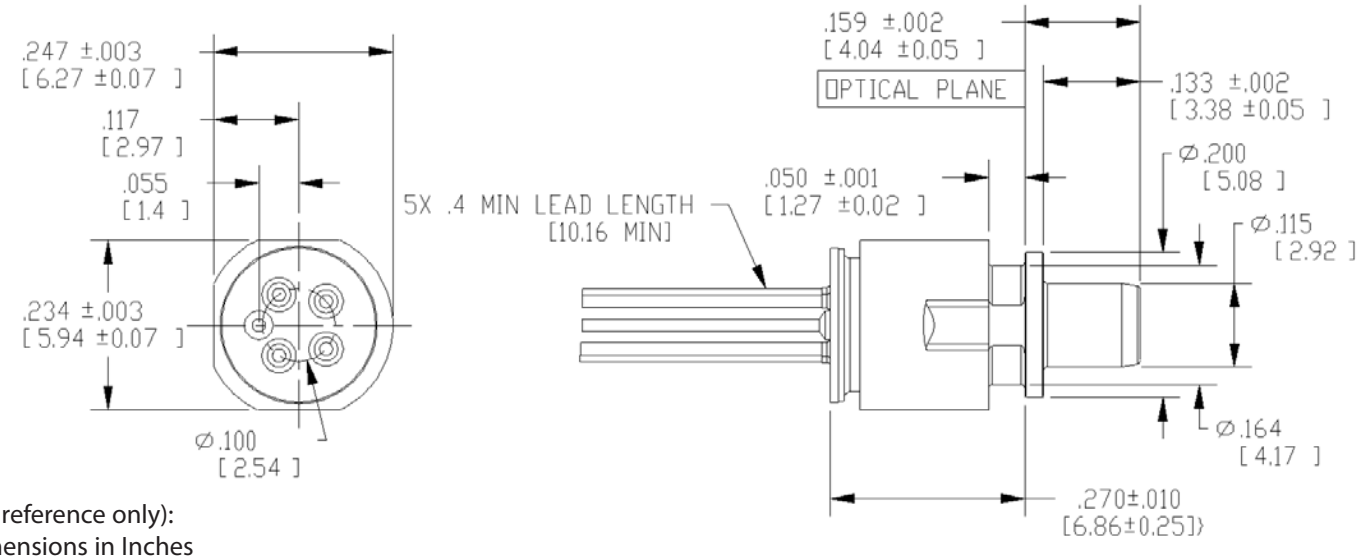
RECOMMENDED INTERFACE CIRCUIT FOR THE HFD7181-XXX



Optional 100Ω differential termination for high impedance limiting amplifiers is shown in red



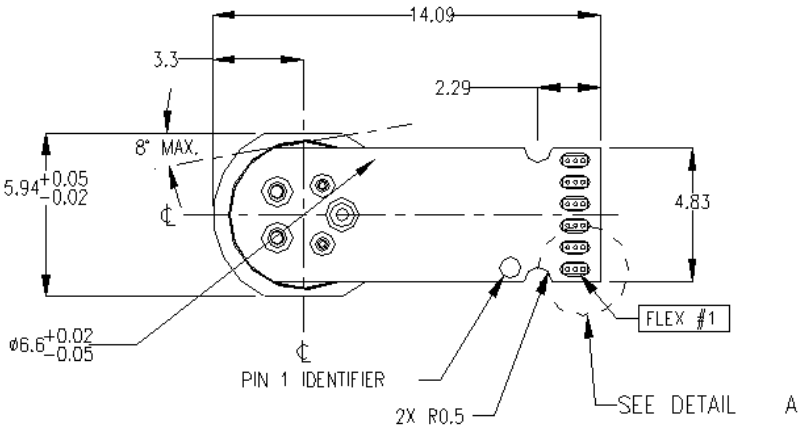
MOUNTING DIMENSIONS HFD7181-001

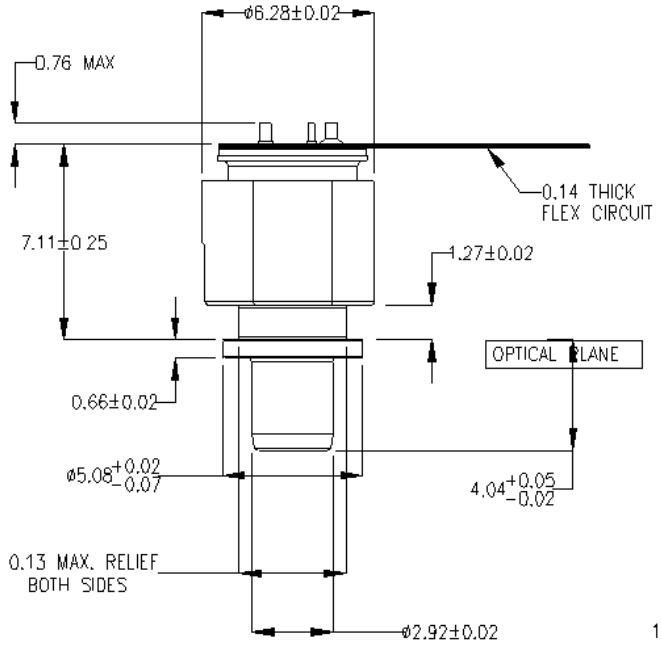


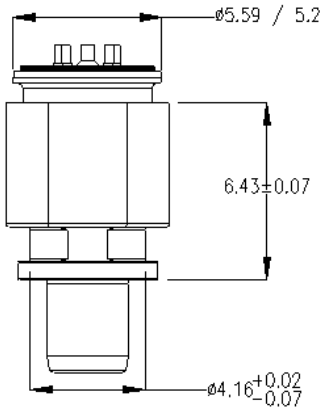
(for reference only):
Dimensions in Inches

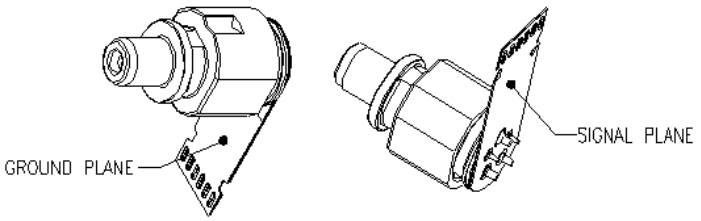
MOUNTING DIMENSIONS – HFD7181-413 LC ROSA WITH FLEX

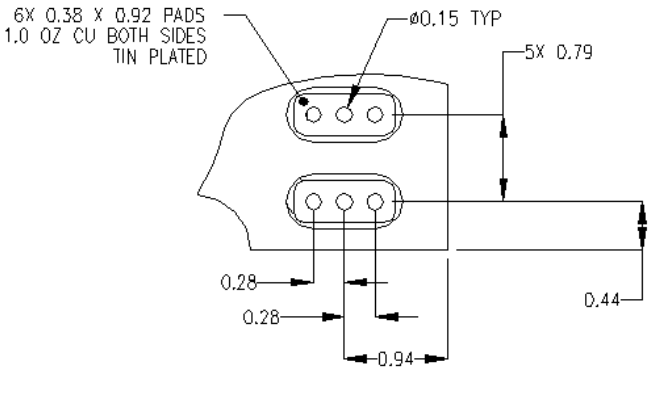
(for reference only): Dimensions in Inches











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

Finisar
Advanced Optical Components Division

Phone:1-866-MY-VCSEL USA (toll free)
1-214-509-2700 USA (Direct dial)
44 (0) 174 336 5533 Europe
886-935-409898 China & Taiwan
81-90-4437-1130 Japan
82-11-220-6153 Asia Pacific & Korea

Fax: 1-214-509-3709 USA

Email: support@adopco.com
WEB: www.finisar.com/aoc.php