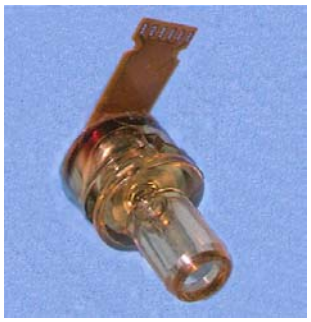
10 Gbps 850nm PIN + Preamp	Preliminary
LC AND SC ROSA Package	HFD6x80-413

Key Features:

- LC ROSA HFD6180-413
- SC ROSA HFD6380-413
- High performance GaAs PIN photodiode with separate transimpedance amplifier
- Low electrical parasitic TO46 package
- Data rates up to 12.5Gbps
- Separate detector bias pin can be used for receive power monitoring
- Low power dissipation
- Can drive SERDES directly
- Flex circuit interface fits all 10GB MSAs

LC ROSA



SC ROSA

The HFD6x80-413 uses a high-performance GaAs PIN photo-detector packaged with a transimpedance amplifier designed to meet performance requirements for 10Gbps 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.

The HFD6x80 is designed to be paired with Advanced Optical Components HFE6x9x VCSEL 10Gbps TOSA products (see data sheets for HFE6x9x products at www.advancedopticalcomponents.com).

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating
Storage Temperature	-40 to +85°C
Case Operating Temperature	-10 to +75°C
Lead Solder Temperature	260°C, 10 sec.
Power Supply Voltage	-0.3V to 3.6V
PIN Voltage	10V
Incident Optical Power	0 dBm average, +4 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

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ELECTRO-OPTICAL CHARACTERISTICS
Vcc=3.3V, AC coupled to 50Ω (100Ω differential), 0°C<T<70°C unless otherwise specified

Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Data Rate		DR			10.7	GBd	1
Input Optical Wavelength	0°C to 70°C	λ_P	830	850	870	nm	
Supply Voltage			3.135	3.3	3.465	V	
Supply Current	P_R =0μW, R_L=50Ω AC coupled	I_{CC}		55	73	mA	2
PD Bias Voltage		VPD_Bias	3.125	3.3	5.25	V	
Photodiode Responsivity	P_R =-12dBm	Resp	0.45	0.5	0.6	A/W	2
Active Area (diameter)				40		μm	
Optical Return Loss	P_R =-12dBm	ORL	12			dB	
Differential Output Voltage Swing	$P_{R,OMA}$= -12Bm, AC Coupled to R_L=50Ω	$V_{o(pk-pk)}$	60	200	330	mV	2,3
Differential Responsivity	$P_{R,OMA}$ = -12dBm, AC Coupled to R_L=50Ω	T	1000	2000	4000	V/W	2,3
-3dB Optical/Electrical Bandwidth	$P_{R,OMA}$ =-12dBm Temp = 25°C	BW	7.5	8.5	12.3	GHz	4
Low Frequency –3dB Cutoff	$P_{R,OMA}$ =-12dBm	BW_{LF}			90	KHz	2,3
Output Impedance		Z_{OUT}	42	50	58	Ω	
RMS Input Referred Noise Equivalent Power	7500 MHz, 4-pole BT Filter, P_R=0uW (Dark), BER 10^-12	NEP			40	μW	5
Sensitivity, OMA		S		-12.75	-12	dBm	6
Stressed Sensitivity	Per IEEE802.3ae	$S_{Stressed}$		-10.5	-9	dBm	7
Rise/Fall Time	$P_{R,OMA}$ =-12dBm, (20%-80%)	T_R/T_F		30	50	ps	3,8
Group Delay	Measured from |S21| Phase	GVD	-50		50	ps	
Power Supply Rejection Ratio	P_R =0μW (Dark), Freq = 1000MHz	PSRR		30		dB	2,9

Notes:
1. The data rate can be increased to 12.5Gbps, but the sensitivity will be decreased by approximately 3dB.
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)

$$P_{R,OMA} \equiv \frac{2P_R(ER-1)}{ER+1}$$ where ER is the extinction ratio (linear) of the optical source.

4. Bandwidth and Low Frequency Cutoff are measured with a small signal sinusoidal light source with –12dBm average power
5. RMS input referred optical noise equivalent power is obtained by measuring the RMS output noise into an 7500 MHz, 4-pole Bessel-Thompson filter then dividing by the responsivity.
6. Sensitivity is measured with an optical source with an extinction ratio of 3dB.
7. Stressed receiver sensitivity is measured with 3.5dB vertical eye closure (intersymbol interference) and with 0.3UI of jitter added. The measurement technique is defined in IEEE 802.3ae.
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 limiting amplifier may be required for operation.

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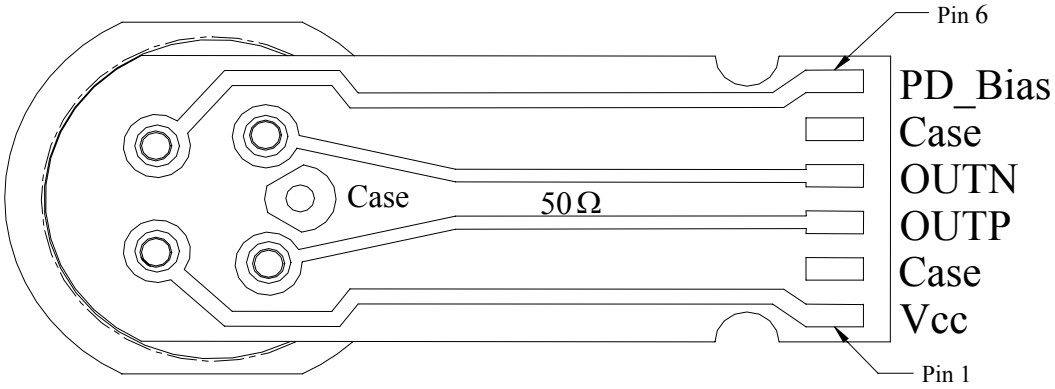
ORDER GUIDE:

Catalog Listing	Description
HFD6180-413	LC ROSA, with flex
HFD6380-413	SC ROSA, with flex

PINOUT

HFD6x80-413	
Number	**Function**
1	Vcc
2	CASE
3	OUTP
4	OUTN
5	CASE
6	PD_Bias



HFD6180-413

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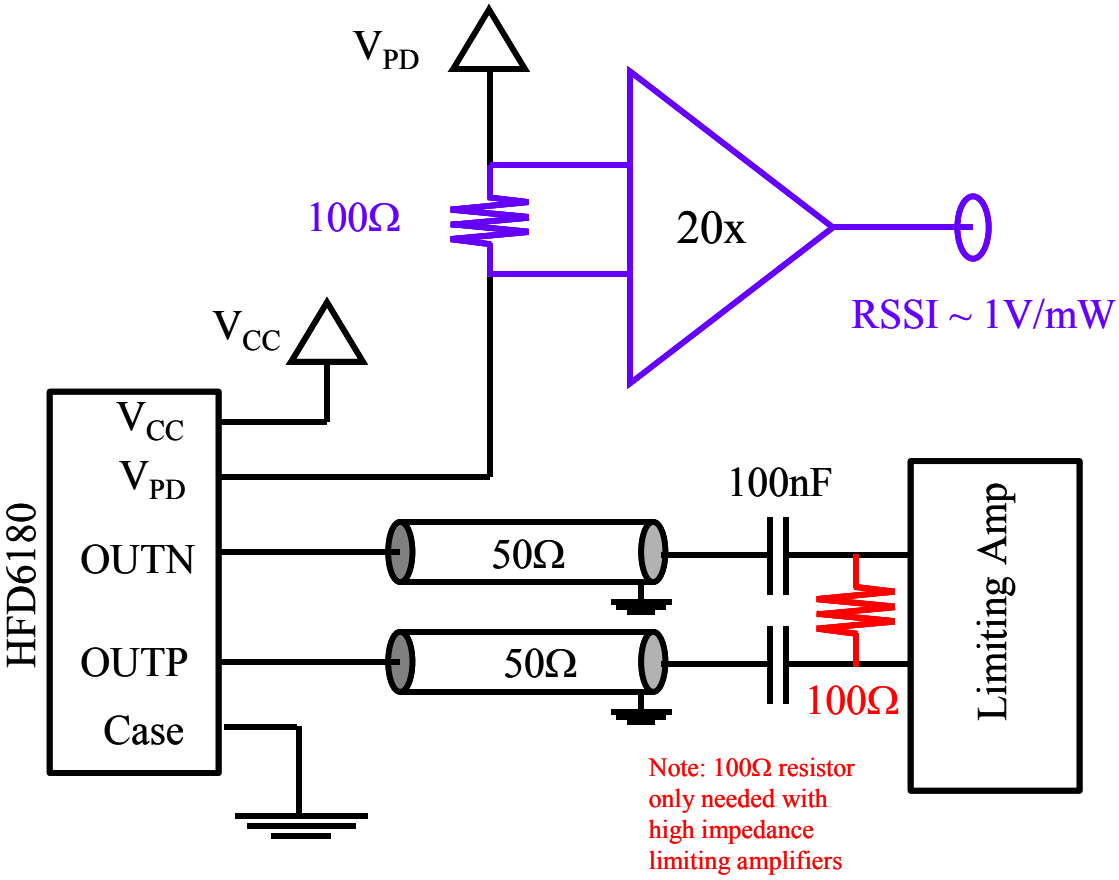
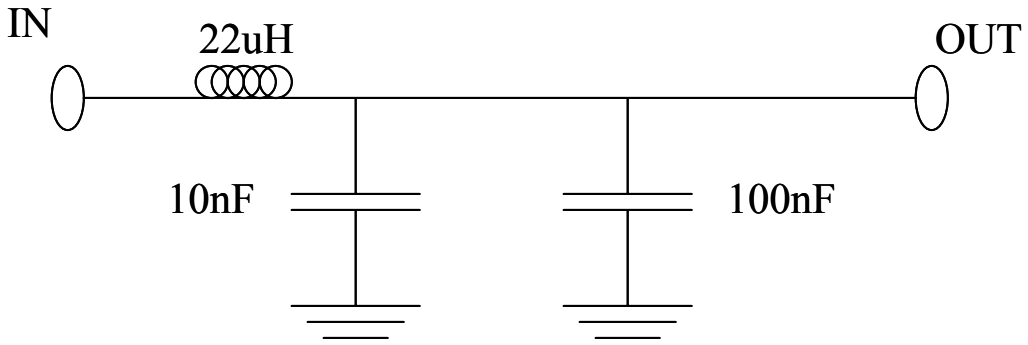
Recommended interface circuit for the HFD6x80-413



Optional RSSI implementation is shown in blue.
Optional 100Ω differential termination for high impedance limiting amplifiers is shown in red.



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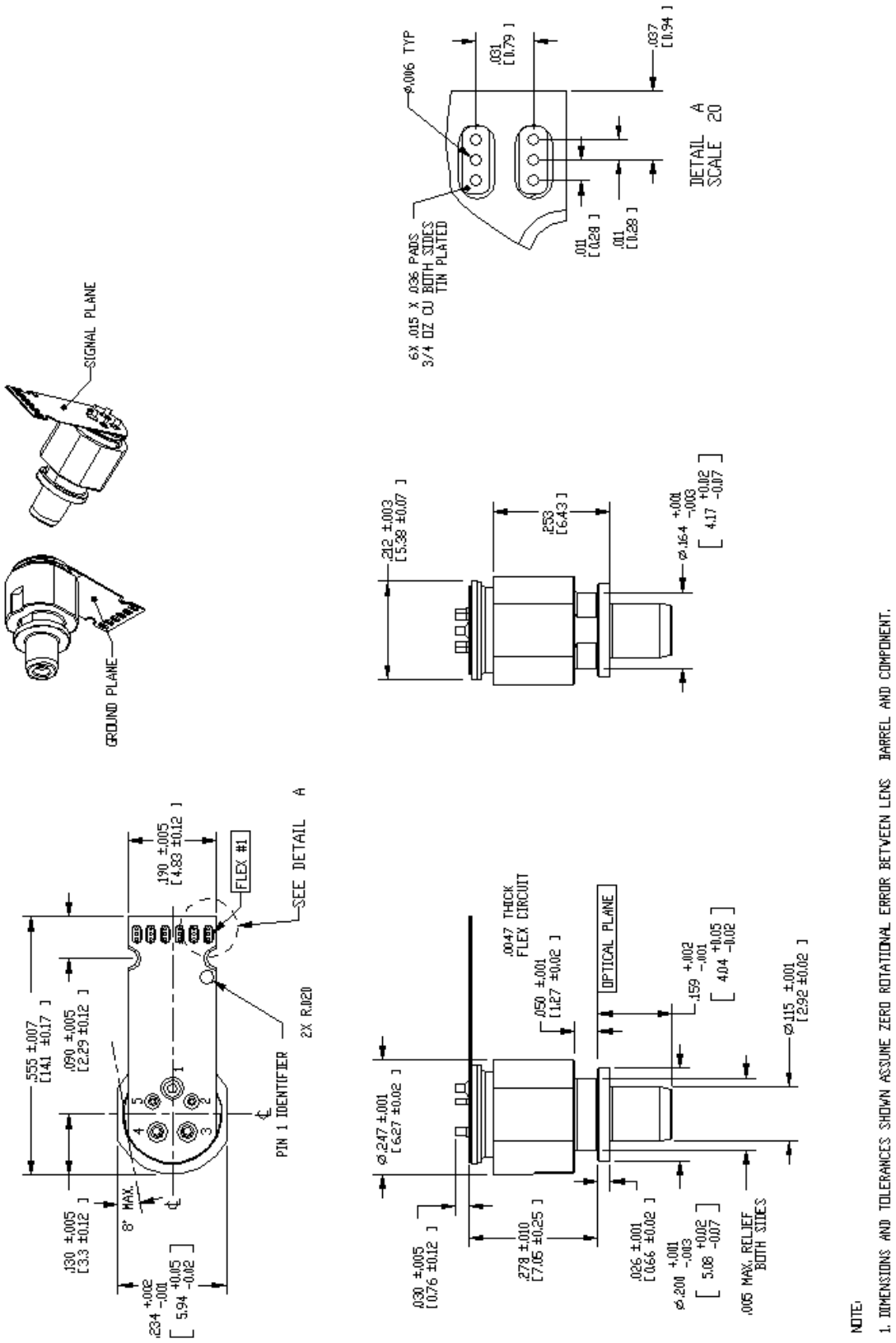
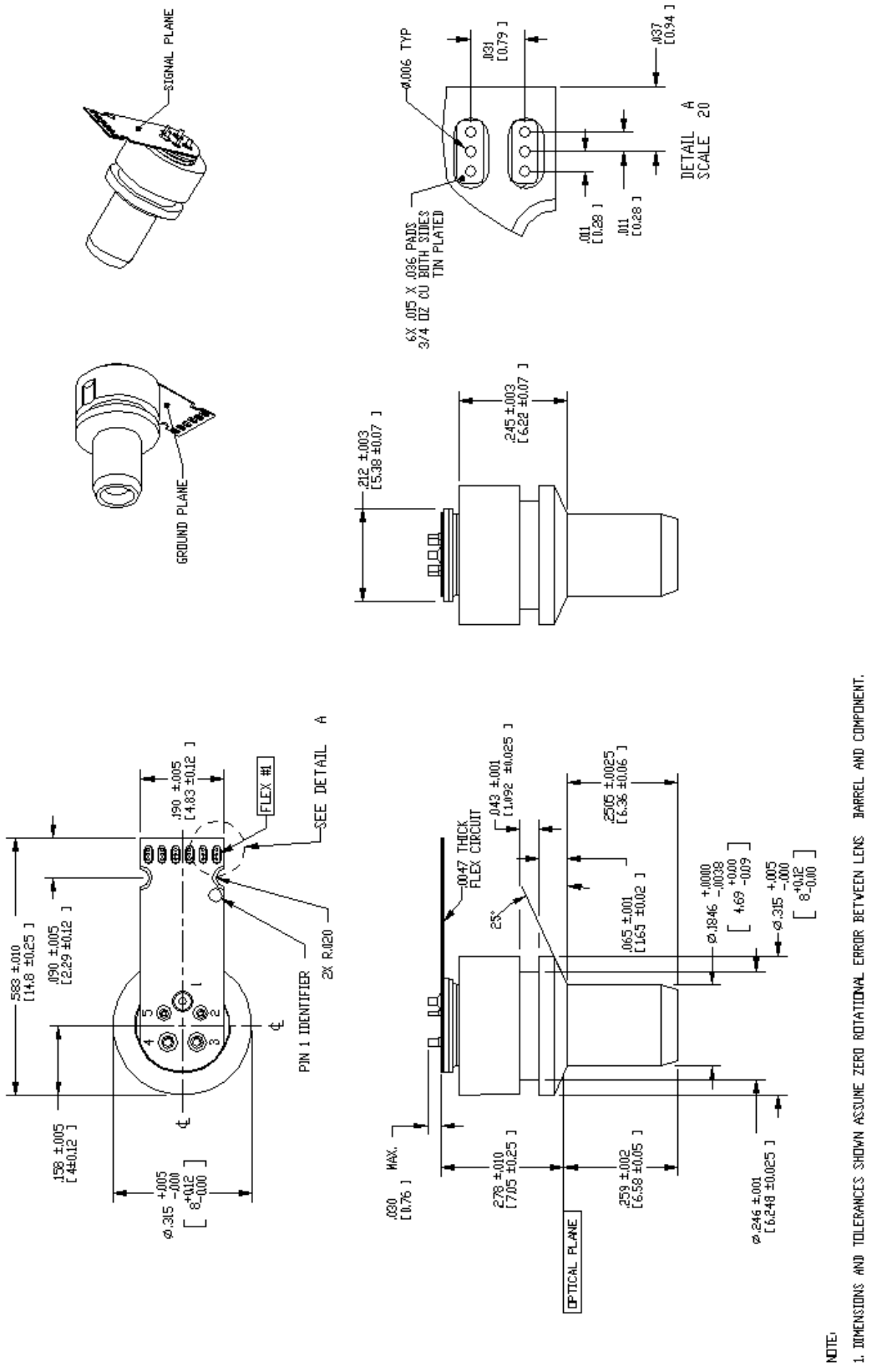
Mounting Dimensions - LC ROSA with flex - dimensions in Inches



10 Gbps 850nm PIN + Preamp	Preliminary
LC AND SC ROSA Package	HFD6x80-413

Mounting Dimensions - SC ROSA with flex - dimensions in Inches



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Warranty/Remedy
ADVANCED OPTICAL COMPONENTS warrants goods of its manufacture as being free of defective materials and faulty workmanship. Commencing with the date of shipment, ADVANCED OPTICAL COMPONENTS warranty runs for 18 months. If warranted goods are returned to ADVANCED OPTICAL COMPONENTS during that period of coverage, ADVANCED OPTICAL COMPONENTS will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**
While we provide application assistance, personally and through our literature, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

ADVANCED OPTICAL COMPONENTS CAPABILITIES
ADVANCED OPTICAL COMPONENTS has led the industry in high volume VCSEL technology since 1996. VCSELs (Vertical Cavity Surface Emitting Lasers) are semiconductor lasers which are impacting advances in optical communication, and sensor applications. VCSELs' superior reliability, low drive current, high coupled power, narrow and circularly symmetric beam and versatile packaging options are enabling solutions not possible with other optical technologies. ADVANCED OPTICAL COMPONENTS advanced capabilities include

- 10Gbps serial VCSEL solutions
- Proton-implanted and oxide VCSELs
- 850nm is currently available. 780nm, 670nm and additional wavelengths are in development
- Packaging: surface mount, TO, SC, LC, MU, arrays, plastic packaging
- Assemblies: chip on board, chip on chip, plastic components and optical subassemblies
- All configurations (polarities and attenuation) are available
- VCSEL and Detector arrays
- Long wavelength detectors
- Custom packaging options

LOCATIONS
Richardson, TX
- Business unit headquarters, wafer growth, wafer fabrication and TO package assembly

SALES AND SERVICE
On March 1st, 2004, Finisar Corp. purchased Honeywell VCSEL Optical Products Division and created a wholly separate division. ADVANCED OPTICAL COMPONENTS, a division of Finisar Corp. 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:

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