DATA SHEET

2.5GBPS 850NM PIN + PREAMP WITH RSSI - TO-46 PACKAGE

HFD3081-103

FEATURES:

- TO-46 hermetic package
- Data rates from 155 Mbps to 2.5 Gbps
- GaAs PIN detector
- Operation at 3.3V
- Differential output for low noise
- 2.0GHz typical Bandwidth
- RSSI capability with external access to the PIN.

The HFD3081-103 is a high-performance 850nm integrated GaAs detector and pre-amplifier TO-46 hermetic component, the product is designed for ease of use in modules designed for 2.5GB/s data rate.

The HFD3081-103 converts optical power into a differential output electrical signal that is used in fiber optic communications and other applications. As the light increases, the differential output voltage increases, limiting at input powers above –10dBm. The differential output is designed to be AC coupled into a data amplifier. The component requires alignment in a lens system which focuses the light onto the photodiode active area.

The HFD3081-103 is designed to interface with 50/125 and 62.5/125mm multimode fiber.

The HFD3081-103 is designed to be paired with AOC VCSEL products (see data sheets for HFE409x products).

Part Number	Description
HFD3081-103	PIN + Preamp with RSSI, TO-46 Component

Finisar
Advanced Optical Components Division

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating
Storage temperature	-40°C to +85°C
Case Operating temperature	-40°C to +85°C
Lead solder temperature	260°C, 10 seconds
Power Supply Voltage	-0.5V to 4V
Incident Optical Power	+3 dBm average, +6 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

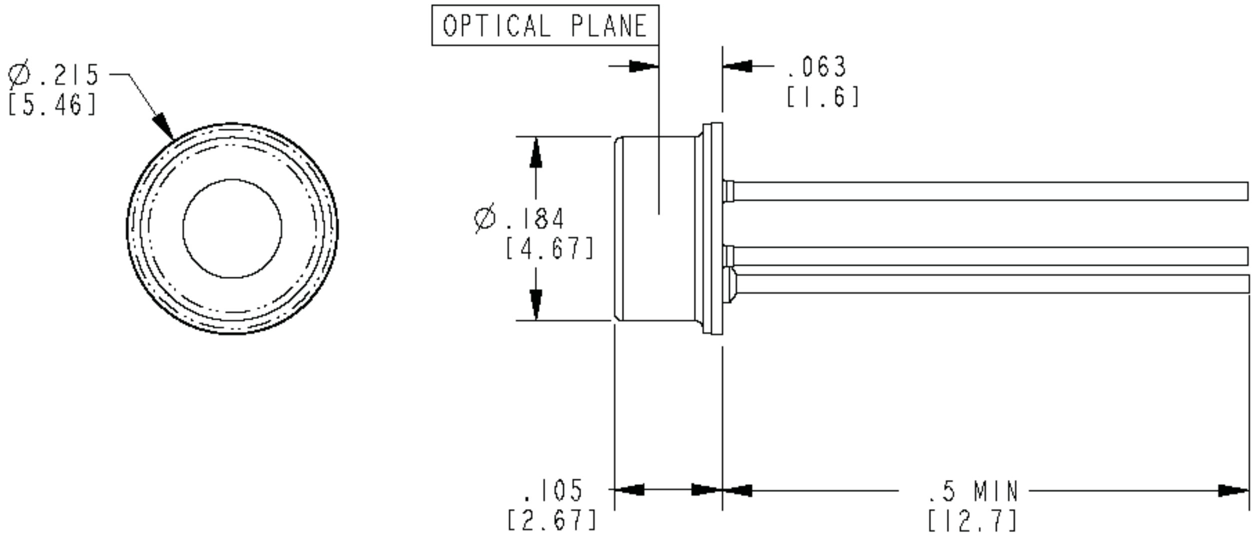
Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Data Rate		DR	0.15		2.5	Gbps	
Supply Voltage			3.0	3.3	3.6	V	
Supply Current	PR =0 µW, RL=50 Ω AC coupled	ICC		25	35	mA	1
Input Optical Wavelength	$0^{o}C$ to $70^{o}C$	λ_P	770	850	870	nm	
Maximum Average Input Power before Overload		P_{MAX}	0	+3		dBm	
Differential Output Voltage Swing	$P_{R,OMA}$ = -12Bm, AC Coupled to R_L=50Ω	$V_{o(pk-pk)}$	100	150	220	mV	1,2
Differential Responsivity	$P_{R,OMA}$ = -12dBm, AC Coupled to R_L=50Ω	T	1600	2700	3900	V/W	1,2
-3dB Optical/Electrical Bandwidth	$P_{R,OMA}$ = -12dBm	BW	1.4	2		GHz	1,2,3
Low Frequency –3dB Cutoff	$P_{R,OMA}$ = -12dBm	BW_{LF}			10	KHz	1,2,3
Output Impedance		Z_{OUT}	42	50	58	Ω	
Output Return Loss	F<2GHz	S_{22}	8	12		dB	
RMS Input Referred Noise Equivalent Power	1.875GHz, 4 -pole BT Filter, P_R=0uW (Dark), BER 10^-12	NEP			20	µW, OMA	4
Sensitivity, OMA	DR <= 2.5Gbps	S		-20.5	-18.5	dBm	5
Stressed Sensitivity, OMA	DR <= 2.5Gbps	$S_{Stressed}$		-17.5	-14.5	dBm	5,6
Rise/Fall Time	$P_{R,OMA}$ =-12dBm, (20% -80%)	T_R/T_F		120	150	ps	2,7
Pulse Width Distortion		PWD			5	%	
Power Supply Rejection Ratio	P_R =0µW (Dark), 5MHz<F<2GHz	PSRR	20			dB	1,8
Monitor Current Slope	P_R =-12dBm	I_{MON}	0.50	0.55	0.60	A/W	9
Monitor Current Offset	P_R =0mW	I_{OFFSET}			10	nA	
PD Bias Voltage		PD_{BIAS}	Vcc -1	Vcc	Vcc+0.5	V	
Group Delay	$P_{R,OMA}$ = -12dBm, AC Coupled to R_L=50Ω 2MHz<F<2GHz	Delay	-50		50	ps	10
Deterministic Jitter	$P_{R,OMA}$ = -12dBm, AC Coupled to R_L=50Ω	DJ_{TIA}		30	40	ps	11
Random Jitter	$P_{R,OMA}$ = -12dBm, AC Coupled to R_L=50Ω	RJ_{TIA}		3	5	ps	12

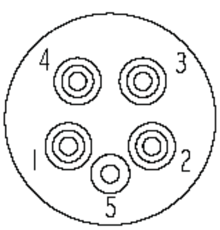
3.0V<Vcc<3.6V, AC coupled to 50Ω (100Ω differential), $-40^{o}C<T<85^{o}C$ unless otherwise specified

NOTES

1. P_R is the average optical power at the fiber face. No loss in external optical system is assumed; any actual power loss in external optics should be considered in the system design.
2. $P_{R,OMA}$ 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.
3. Bandwidth and Low Frequency Cutoff are measured with a small signal sinusoidal light source with –12dBm average power
4. RMS input referred optical noise equivalent power is obtained by measuring the RMS output noise into a 1875 MHz, 4-pole Bessel-Thompson filter then dividing by the responsivity. A scaling factor of 14 is used to predict a BER of 10^{-12}.
5. Sensitivity is measured with an optical source with an extinction ratio of 3dB.
6. 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.
7. Rise/Fall times are corrected for optical source Rise/Fall times. $T^2_{TIA} = T^2_{MEASURED} - T^2_{OPTICAL}$
8. Value shown is with no external power supply filtering.
9. The monitor current slope is measured as the current into the PDBIAS connection.
10. Group delay is a sensitive measurement to package interface, and includes the effects of PD, TIA and package. Measurement is made with TO leads as short as possible.
11. DJ_{TIA} is specified as contributed DJ by the TIA, obtained from $DJ^2_{TIA} = DJ^2_{TOTAL} - DJ^2_{OPTICAL}$
12. RJ_{TIA} is specified as contributed DJ by the TIA, obtained from $RJ^2_{TIA} = RJ^2_{TOTAL} - RJ^2_{OPTICAL}$

MECHANICAL DIMENSIONS





LEAD-END VIEW

PIN	FUNCTION
1	VOUTN
2	VOUTP
3	VPD
4	VCC
5	GND (CASE)

PINOUT

Number	Function
1	Inverted Output
2	Non Inverted Output
3	VPD
4	VCC
5	GND (case)

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