

## Fiber Optic LAN Components Connectorized PIN Plus Preamplifier

### *HFD3381-002*

#### FEATURES

- Prealigned SC Connector sleeve
- Data rates > 1GHz
- PIN detector and preamplifier in a TO-46 hermetic package
- 5V or 3.3V operation
- GaAs PIN detector and BiCMOS preamplifier
- Differential Output for low noise
- 1.1GHz Typical Bandwidth



The HFD3381-002 is a high-performance 850nm GaAs detector and pre-amplifier packaged for high-speed data communications. The product is designed for ease of use by the module designer or manufacturer in IEEE 802.3z (1.25Gbps Ethernet), ANSI 10625 (1.062 Gbps Fibre Channel) and ATM XXX, (622Mbps) communications standards.

The HFD3381-002 converts optical power into an electrical signal that is used in fiber optic communications and other applications. As the light increases, the output voltage increases, limiting at input powers above  $-10\text{dBm}$ . The differential output is designed to be AC coupled into a data amplifier. The pre-aligned and lensed package with an industry standard SC style connector sleeve, allows for "drop in" assembly to reduce manufacturing cost.

The Honeywell HFD3381-002 is designed to interface with 50/125 and 62.5/125mm multimode fiber.

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### ABSOLUTE MAXIMUM RATINGS

Parameter	Rating
Storage Temperature	-40 to +85°C
Case Operating Temperature	0 to +70°C
Lead Solder Temperature	260°C, 10 sec.
Power Supply Voltage	-0.5 to 6 V
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.

### ELECTRO-OPTICAL CHARACTERISTICS (V<sub>cc</sub>=3.3V, 0°C<T<70°C unless otherwise specified)

Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
<b>Electrical Characteristics</b>							
Supply Voltage	P <sub>in</sub> = 0μW, R <sub>load</sub> =50Ω	V <sub>cc</sub>	3.0		5.5	Volts	1
Supply Current	P <sub>in</sub> = 0μW, R <sub>load</sub> =50Ω	I <sub>cc</sub>		35	47	mA	1
Output Offset Voltage	P <sub>in</sub> = 0μW, R <sub>load</sub> =50Ω	V <sub>offset</sub>	-100		100	mV	9,10
Output Resistance	Single ended, freq = 0Hz	R <sub>o</sub>	40	50	62	Ω	
<b>Opto-Electronic Characteristics</b>							
Responsivity	P <sub>in</sub> < AGC <sub>th</sub> , R <sub>load</sub> =50Ω	R	2500	3500	5000	μV/μW	2,3,10
Differential Output Voltage	P <sub>in</sub> = 200μW, R <sub>load</sub> =50Ω, V <sub>offset</sub> = 0 mV	V <sub>out</sub>		170	400	mV	1
Upper 3dB Bandwidth		BW <sub>upper</sub>	850	1100	1500	MHz	4
RMS Output Referred Noise	P <sub>in</sub> =0μW, R <sub>load</sub> =50Ω 937.5 MHz BT Filter			1.67	2.25	mV	5
Sensitivity	BER=10 <sup>-12</sup> , SNR=7	S	-20	-24		dBm	
Power Supply Rejection Ratio	P <sub>in</sub> =0μW, R <sub>load</sub> =50Ω	PSRR	10	30		dB	6
Pulse Width Distortion	P <sub>in</sub> =20μW peak, R <sub>load</sub> =50Ω	PWD			40	ps	7
Rise/Fall Time	P <sub>in</sub> =20μW peak, R <sub>load</sub> =50Ω	T <sub>R</sub> /T <sub>F</sub>			370	ps	8
Spectral Responsivity	P <sub>in</sub> =20μW peak, R <sub>load</sub> =50Ω	λ	760	850	860	nm	
AGC <sub>th</sub> threshold power	V <sub>offset</sub> = 0mV, Pin = Peak power	AGC <sub>th</sub>		60		μW	9,10

### Notes:

- Pin refers to the peak optical power at the face of the fiber optic cable input to the HFD3180-102.
- Responsivity measured with source wavelength of 850nm, freq = 0Hz, P<sub>in</sub>< AGC<sub>th</sub>, R<sub>load</sub>=50Ω, sample tested at 2.5Gbps
- The output voltage increases as received light power increases, up to approximately -15dBm depending upon the AGC<sub>th</sub>. The preamplifier is designed to limit the electrical output signal above this optical input level, and does not introduce signal distortion until the average input power exceeds 0dBm.
- Bandwidth is measured with a small signal sinusoidal light source with 50 μW average power, R<sub>load</sub>=50Ω.
- RMS input referred optical noise is sample tested by measuring the RMS output referred noise, then dividing by the responsivity.
- PSRR is sample tested from 300KHz to 1GHz by injecting a -20dB electrical signal on the V<sub>cc</sub> pin. The nominal value at 100MHz is recorded. No external bypass components are assumed. An external V<sub>cc</sub> filter network will greatly increase the PSRR.
- Sample tested at the 50% level of output pulses.
- Rise and fall times are sample tested with source wavelength of 850nm, 125MHz square wave, with optical rise and fall times < 200ps, P<sub>in</sub>< AGC<sub>th</sub>, R<sub>load</sub>=50Ω. Measured at 20% - 80% signal levels
- Output offset voltage is defined as V<sub>out</sub> - V<sub>outQ</sub> with no light
- The AGC<sub>th</sub> power depends on the offset voltage. Refer to fig 3.

### 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

# Fiber Optic LAN Components

## Connectorized PIN Plus Preamplifier

HFD3381-002

FIGURE 1: INTERNAL SCHEMATIC DIAGRAM OF THE HFD3381-002

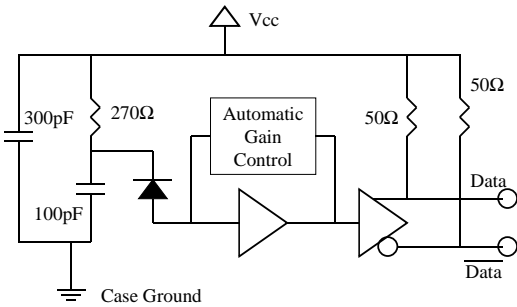
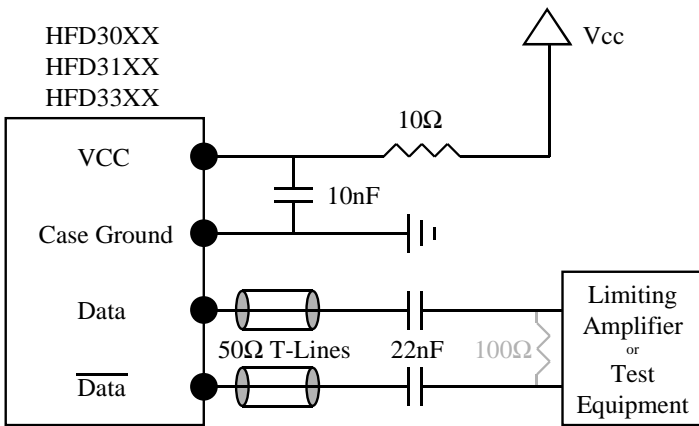


FIGURE 2: RECOMMENDED INTERFACE CIRCUIT FOR THE HFD3381-002



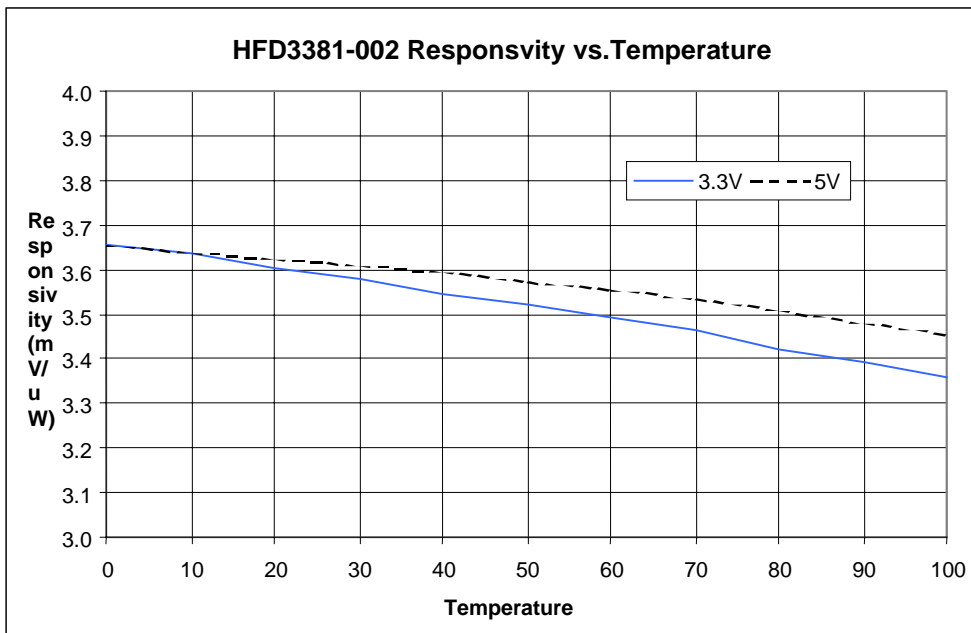
Note: 100Ω terminating resistor is optional

R=10 Ω

C<sub>1</sub> = 10 nF

C<sub>2</sub> = Data rate dependant (22nF for rates > 1Gbps)

FIGURE 3: AGC THRESHOLD POWER VS. OUTPUT OFFSET VOLTAGE



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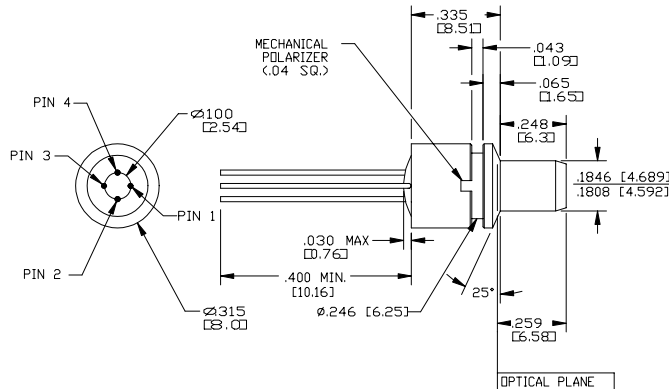
## Connectorized PIN Plus Preamplifier

# HFD3381-002

### ORDER GUIDE

Catalog Listing	Description
HFD3381-002	Connectorized PIN Plus Preamplifier

### MOUNTING DIMENSIONS (for reference only) in./(mm)



### PINOUT

Number	Function
1*	V <sub>CC</sub>
2	Inverted Output
3	Ground
4	Non Inverted Output

\* Aligned with the Receptacle notch

\* VCC is cut shorter.

### WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Commencing with the date of shipment, Honeywell's warranty runs for 18 months. If warranted goods are returned to Honeywell during that period of coverage, Honeywell 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.**

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