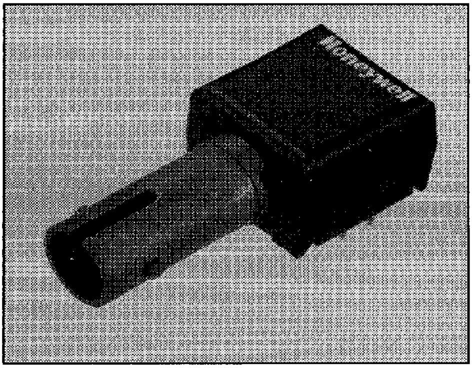
Not recommended for new designs see HFD3224-002

HFD3221

125 MHz PIN Plus Preamplified Analog Receiver

FEATURES

- Industry standard ST® fiber connector
- High-speed operation, Rise/Fall times are 3.5 ns typical
- Low pulse width distortion over a wide range of inputs because of 23 dB typical dynamic range
- Wide variety of cable options, operates with 50/125, 62.5/125, and 100/140 µm cables
- Popular Fiber DIP package
- Wide operating temperature range -40 to +85°C
- Non-conductive plastic ST® barrel



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DESCRIPTION

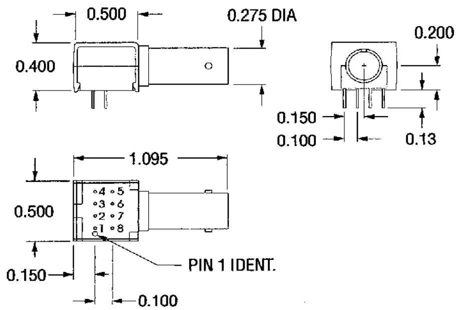
The HFD3221 is designed for use in IEEE 802.3 Ethernet and IEEE 802.5J Token Ring LAN applications such as Repeaters, Bridges, Hubs, Routers, Switches and Gateways. The inexpensive, high speed, analog fiber optic receiver is intended for local area networks (LANs) where data rates up to 125 Mbits/second are needed. The HFD3221 may be used as a low cost alternative to 1300 nm components. The hybrid bipolar fiber optic receiver contains a silicon PIN photodiode for high speed operation and a preamplifier integrated circuit for excellent noise immunity.

The HFD3221s preamplifier stage converts the current output of the PIN photodiode to a voltage and amplifies it. The output is a linear voltage that is proportional to the optical input over an input range of less than 1.0 µW to 175 µW peak (1.225 V typical output voltage swing), providing a dynamic operating range of 23 dB with very low pulse width distortion.

The HFD3221 is designed to operate on the ECL standard of -5.2 volts and has very good Power Supply Rejection Ratio (typically 20 dB at 10 MHz), making it highly immune to noise pickup. It can also be operated with a +5 Volt supply although some PSRR performance will be sacrificed at less than 1 MHz.

The receiver output is a proportional analog voltage, providing cost-effective design flexibility. The user can tailor the circuit design to the particular application, using inexpensive external components to perform the conversion to the needed logic levels. This allows for an optimized design, making maximum use of the power budget for a given data rate/transmission distance configuration.

OUTLINE DIMENSIONS in inches (mm)



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Pinout

1. NC*	5. NC*
2. Output	6. V_{CC}
3. V_{EE}	7. V_{EE}
4. NC*	8. NC*

* Pins 1,4, 5 & 8 are common.

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HFD3221

125 MHz PIN Plus Preamplified Analog Receiver

ELECTRO-OPTICAL CHARACTERISTICS (V_{EE} = -5.2 V, T_C= 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Responsivity HFD3221-002	R				mV/µW	f = 50MHz, P_{IN} = 100µW peak, λ = 850 nm, 62.5 µm core fiber
T = 25°C		5.3	7.5	9.6		
Over Temp. Range -40 < T < +85°C		4.5		11.5		
Input Power	P_{IN} (Peak)	0.8		175	µW	f = 50 MHz, λ = 850 nm PWD = 2.5 ns
DC Output Voltage (1)	V_{ODC}	-4	-3.65	-3.3	V	$P_{IN} \leq 0.1$ µW
Power Supply Current	I_{CC}		9	15	mA	$R_{LOAD} = 0$
Rise/Fall Time	t_R/t_F				ns	f = 10MHz, P_{IN} = 150µW peak λ = 850 nm
T = 25°C			3.6	4.5		
Over Temp. Range -40 < T < +85°C			3.6	6.3		
Pulse Width Distortion	PWD		0.2	1.5	ns	f = 50MHz, P_{IN} = 150µW peak, λ = 850 nm
Bandwidth	BW		125		MHz	λ = 850 nm, R = 0.707 R max.
RMS Noise Output Voltage	V_{NO}		0.52	0.58	mV	P_{IN} = 0 µW, 75 MHz, 3 pole Bessel filter on output
Output PSRR			20		dB	f = 10 MHz
Output Overshoot			10	13	%	P_{IN} = 10 µW
Output Resistance			20		Ω	f = 50 MHz
RMS Input Noise Power (2)	P_{NI}		74	79	nW	P_{IN} = 0 µW, 75 MHz, 3 pole Bessel filter on output

Notes
1. Quiescent output voltage (V_{ODC}) is -3.65 V typical. Dynamic output voltage swing is below the quiescent output voltage ($V_O = V_{ODC} + R \times P_{IN}$).
2. Photodiode has 600 µm diameter microlens for optical coupling.

ABSOLUTE MAXIMUM RATINGS

(Tcase = 25°C unless otherwise noted)

Storage temperature	-55 to +85°C
Operating temperature	-40 to +85°C
Lead solder temperature	260°C for 10 s

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 operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

RECOMMENDED OPERATING CONDITIONS

Operating temperature	-40 to +85°C
Supply voltage (V_{CC} - V_{EE})	-0.5 to -6.0 V
Optical signal input	1.0 to 125 µW

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

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HFD3221

Not recommended for new designs
see HFD3224-002

125 MHz PIN Plus Preamplified Analog Receiver

ORDER GUIDE

Description	Catalog Listing
125 MHz PIN Plus Preamplifier Analog Receiver	HFD3221-002

CAUTION

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 INTERFACE

Honeywell detectors are designed to interface with multimode fibers with sizes (core/cladding diameters) ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 62.5/125 micron core fiber. The fiber chosen by the end user will depend upon a number of application issues (distance, link budget, cable attenuation, splice attenuation, and safety margin). The 50/125 and 62.5/125 micron fibers have the advantages of high bandwidth and low cost, making them ideal for higher bandwidth installations. The use of 100/140 and 200/230 micron core fibers results in greater power being coupled by the transmitter, making it easier to splice or connect in bulkhead areas. Optical cables can be purchased from a number of sources.

CIRCUIT DIAGRAM

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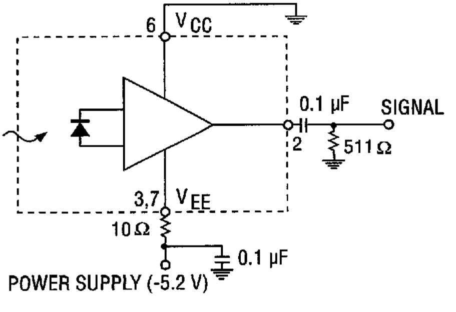

SWITCHING WAVEFORM

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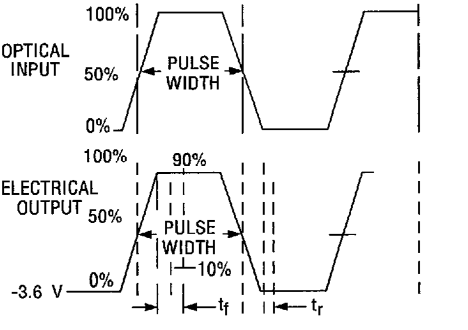

Fig. 1 Spectral Responsivity

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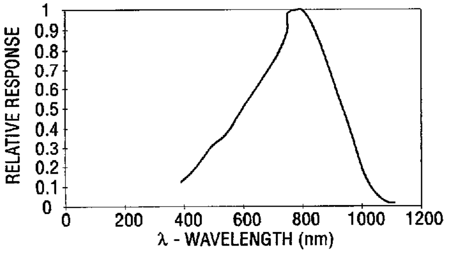

Fig. 2 Pulse Width Distortion vs Optical Input Power

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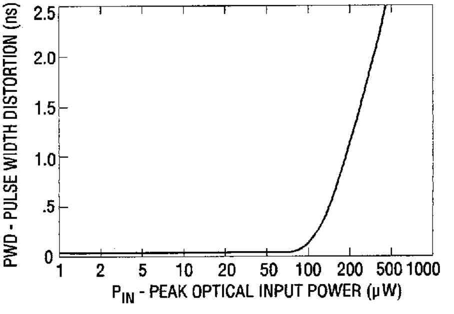

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