HFD3029-002/XXX

Schmitt Input, Non-Inverting TTL Output Receiver

FEATURES

- Converts fiber optic input signals to TTL totem pole outputs
- Maximum sensitivity 1.5 μW peak (-28.2 dBm)
- Wide variety of cable options, operates with 50/125, 62.5/125, and 100/140 μm cables
- Schmitt circuitry gives 17dB minimum dynamic range and low Pulse Width Distortion
- Operates up to 200K bps NRZ
- Designed to operate with Honeywell 850 nm LEDs
- Single 5 V supply requirement
- Wave solderable
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFD3029-002/XXX is a sensitive Schmitt triggered optical receiver designed for use in short distance, 850 nm fiber optic systems. The bipolar integrated receiver circuit has internal voltage regulation. The HFD3029-002/XXX also uses an internal photodiode. The TTL non-inverting output allows the HFD3029-002/XXX to be directly interfaced with standard digital TTL circuits.

APPLICATION

The HFD3029-002/XXX fiber optic receiver converts the optical signal in a point to point data communications fiber optic link to a TTL output. It is mounted in a fiber optic connector that aligns the optical axis of the component to the axis of the optical fiber.

Electrical isolation is important in obtaining the maximum performance of this high sensitivity receiver. Shielding can reduce coupled noise and allow maximum sensitivity to be obtained. This can include the use of ground planes in the PCB, shielding around the device, and shielding around the leads.

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APPLICATION (continued)

An internal voltage regulator allows operation with a 5 volt supply. An external bypass capacitor (0.1 μF) between V_{CC} (pin 1) and ground (pin 3) is recommended for maximum power supply noise rejection.

Honeywell also offers companion transmitters designed to operate in conjunction with the HFD3029-002/XXX.

Optical power (photons) from the fiber strikes the photodiode and is converted to electrical current. The current is converted into voltage in the transimpedance preamplifier. The Schmitt trigger circuitry in the comparator stage provides proper output signals. The Schmitt detection circuit monitors the input preamplifier, and triggers when its output exceeds present levels. Preset levels are above worst case RMS noise level, with 1×10^{-9} bit error rate, while low enough for enough sensitivity to allow operation over long links. This circuitry recognizes positive and negative going input signals. When the optical input goes from low to high, the electrical output changes to "1" (high). The output changes to "0" (low) when the optical input goes from high to low. Bandwidth has been limited to minimize noise problems. The output of the Schmitt Trigger detector stage is designed for good pulse width distortion (PWD).

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ELECTRO-OPTICAL CHARACTERISTICS (V_{CC} = 5.0 V ±0.5 VDC, -40°C < T_C < +85°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Minimum Input Sensitivity T = 25°C	P_{IN} (Peak)		1	1.5	μW	100 μm core fiber Duty Cycle = 50%, 850 μm
High Level Logic Output Voltage	V_{OH}	2.4	3.3		V	P_{IN} ≥ 1.5 μW, V_{CC} = 5.0 VDC
Low Level Logic Output Voltage	V_{OL}		0.3	0.4	V	P_{IN} ≤ 0.1 μW, V_{CC} = 5.0 VDC I_O ≤ 16 mA
Power Supply Current	I_{CC}		6	12	mA	
Rise Time	t_R		12		ns	P_{IN} ≥ 1.5μW, V_O = 0.4 to 2.4V
Fall Time	t_F		3		ns	P_{IN} ≤ 0.1μW, V_O = 2.4 to 0.4V
Pulse Width Distortion	PWD				%	f = 20 kHz, Duty Cycle = 50%
T = 25°C			5	10		P_{IN} ≥ 1.5 μW peak
			5	10		P_{IN} ≥ 100 μW
Bandwidth	BW			200	kHz	P_{IN} ≥1.0μW, Duty Cycle = 50%
Output Impedance	I_O		20		Ω	

ABSOLUTE MAXIMUM RATINGS

(Tcase = 25°C unless otherwise noted)

Storage temperature	-40 to +100°C
Supply voltage	+4.5 to +7.0 V
Lead solder temperature	260°C for 10 s
Junction temperature	150°C

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 +100°C
Supply voltage	+4.5 to +7.0 V
Optical input power	1.5 to 100 μW
Optical signal pulse width	> 4 μs

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ORDER GUIDE

Description	Catalog Listing
Fiber Optic Schmitt Input, Non inverting, TTL Output Receiver	HFD3029-002/XXX

MOUNTING OPTIONS

Substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 441

CAUTION

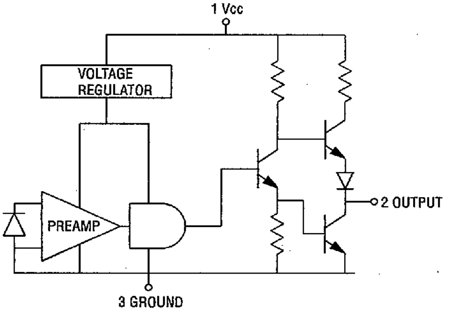
The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

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 100/140 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.

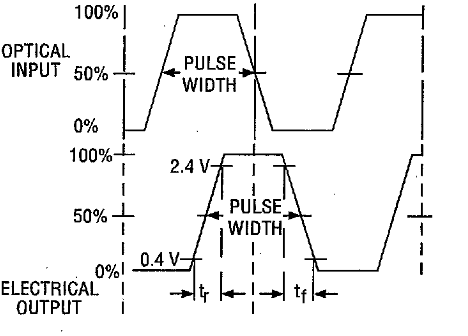
BLOCK DIAGRAM

FIBER101.SCH



SWITCHING WAVEFORM

FIBER003.CIR



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Honeywell

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

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Fig. 1 Pulse Width Distortion vs Temperature

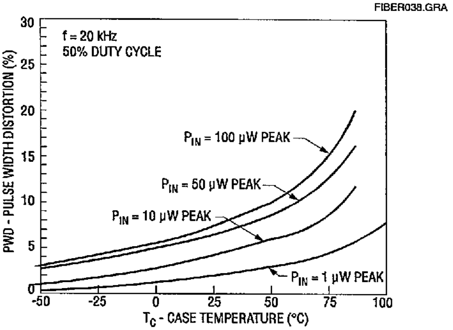


Fig. 2 Pulse Width Distortion vs Frequency

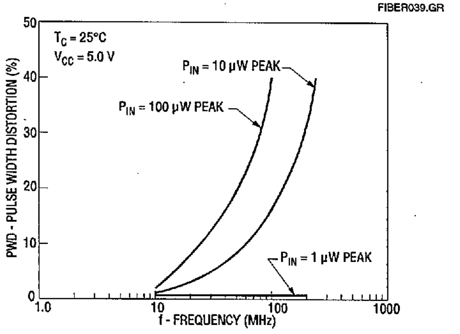


Fig. 3 Pulse Width Distortion vs Optical Input Power

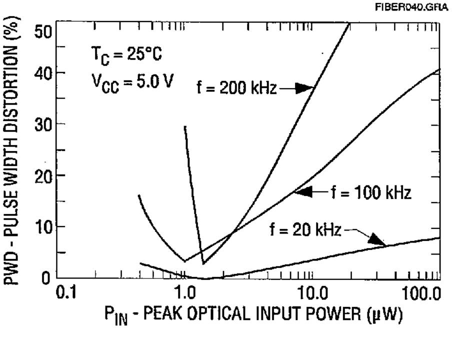
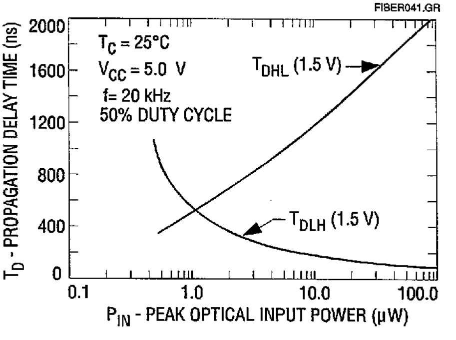


Fig. 4 Propagation Delay vs Optical Input Power



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