HFD3038-00X/XXX

125 MHz PIN Plus Preamplified Analog Receiver

FEATURES

- 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
- Wide operating temperature range -40 to +85°C
- -5.2 V operation
- Differential outputs for noise pick-up immunity (-003)
- Wave solderable
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFD3038-00X/XXX is designed as an inexpensive, high speed, analog fiber optic receiver. It is a low cost alternative to 1300 nm components. The HFD3038-00X/XXX is intended for use in local area networks (LANs) where data rates of 125 Mbits per second or less are needed. The HFD3038-00X/XXX is a hybrid bipolar fiber optic receiver that contains a silicon PIN photodiode for high speed operation and a preamplifier integrated circuit for improved noise immunity.

The HFD3038-00X/XXX has a preamplifier stage that converts the current output of the PIN photodiode to voltage and amplifies it. This provides the HFD3038-00X/XXX with a dynamic range of 23 dB typical and a very low pulse width distortion. The HFD3038-00X/XXX operates on the ECL standard -5.2 V. This component can be used with a +5 V supply if necessary, but the user will sacrifice some PSRR performance at speeds less than 1 MHz.

The HFD3038-00X/XXX output changes from its DC output quiescent voltage towards the V_{CC} potential when light is present at the optical input.

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DESCRIPTION (continued)

The HFD3038-00X/XXX output has a differential linear voltage swing that is proportional to the optical input for an optic power range of 1.0 µW to 175 µW peak (1.4 typical output voltage swing). This device has a superior PSRR which makes it less susceptible to noise pick-up from the user PC board.

You can maximize the "signal distance/data rate" trade-off because the HFD3038-00X/XXXs output is a proportional analog value. This gives you better control of your optic power budget and allows you to convert the analog output signal to the logic levels you need, using low cost external components.

Honeywell

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

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

PARAMETER		SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Responsivity [1]		R				mV/μW	f = 50MHz, P_{IN} = 100μW peak, λ = 850 nm, 62.5 μm core fiber
T = 25°C	IFD3038-002/XXX		5.3	7.5	9.6		
	IFD3038-003/XXX		6	8	11		
-40 < T < +85°C	IFD3038-002/XXX		4.5		11.5		
	IFD3038-003/XXX		4.5		13		
Input Power		P_{IN} (peak)	0.8		175	μW	f = 50 MHz, λ = 850 nm PWD = 2.5 ns
DC Output Voltage [2]							
	IFD3038-002/XXX	V_{ODC}	-4	-3.65	-3.3	V	P_{IN} ≤ 0.1 μW
	IFD3038-003/XXX	V_{ODC}	-2.6	-2.4	-2.2	V	P_{IN} ≤ 0.1 μW
Power Supply Current							
	IFD3038-002/XXX	I_{CC}		9	15	mA	R_{LOAD} = 0
	IFD3894-003/XXX	I_{CC}		11	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	IFD3038-002/XXX			3.6	4.5		
	IFD3038-003/XXX			2.5	4.5		
-40 < T < +85°C	IFD3038-002/XXX			3.6	6.3		
	IFD3038-003/XXX		1.0		5.5		
Pulse Width Distortion		PWD		0.2	1.5	ns	f = 50MHz, P_{IN} = 150μW peak, λ = 850 nm
Bandwidth	IFD3038-002/XXX	BW		125		MHz	λ = 850 nm, R = 0.707 R max.
	IFD3038-003/XXX	BW		125		MHz	λ = 850 nm, R = 0.707 R max.
RMS Noise Output Voltage		V_{NO}				mV	P_{IN} = 0 μW, 75 MHz, 3 pole Bessel filter on output
	IFD3038-002/XXX			0.52	0.58		
	IFD3038-003/XXX			0.46	0.60		
Output PSRR	IFD3038-002/XXX			20		dB	f = 10 MHz
	IFD3038-003/XXX		17	21		dB	f = 10 MHz
Output Overshoot	IFD3038-002/XXX			10	13	%	P_{IN} = 10 μW
	IFD3038-003/XXX				6	%	P_{IN} = 10 μW
Output Resistance				20		Ω	f = 50 MHz
RMS Input Noise Power		P_{NI}				nW	P_{IN} = 0 μW, 75 MHz, 3 pole Bessel filter on output
	IFD3038-002/XXX			74	79		
	IFD3038-003/XXX			60	79		

Notes
1. Photodiode has 600 μm (.024 in.) diameter microlens for optical coupling.
2. Quiescent output voltage (V_{ODC}) is -2.4 V typical. Dynamic output voltage swing is below the quiescent output voltage (V_O= V_{ODC} + R x P_{IN}).
3. Graphs shown are based on -003 product. The -002 product will shift accordingly based on typical values in Electro-Optical Characteristics table.

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HFD3038-00X/XXX

125 MHz PIN Plus Preamplified Analog Receiver

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

ORDER GUIDE

Description	Catalog Listing
125 MHz PIN Plus Preamplifier Single-Ended Output Analog Receiver.	HFD3038-002/XXX
125 MHz PIN Plus Preamplifier Differential Output Analog Receiver	HFD3038-003/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.

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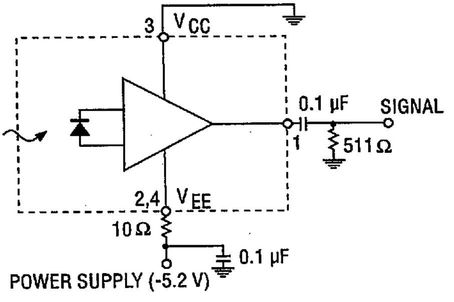
CIRCUIT DIAGRAM - Single Ended Output -002

FIBER006D.SCH



CIRCUIT DIAGRAM - Differential Output -003

FIBER033.SCH

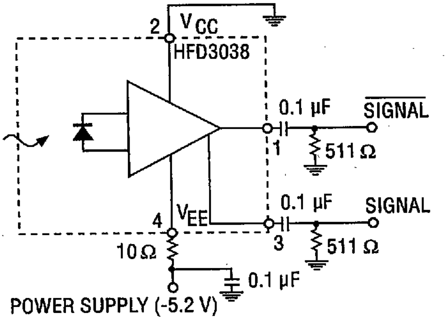


Fig. 1 Spectral Responsivity

FIBER102.GRA

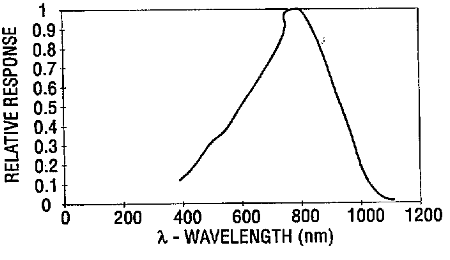


Fig. 2 Responsivity vs Temperature

FIBER125.GR

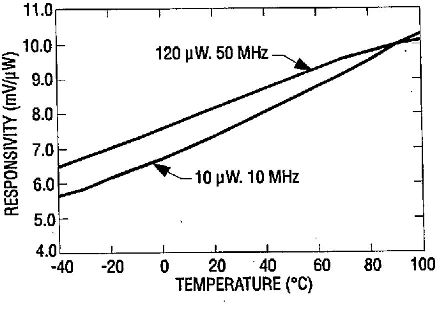


Fig. 3 RMS Noise Voltage vs Temperature

FIBER126.GRA

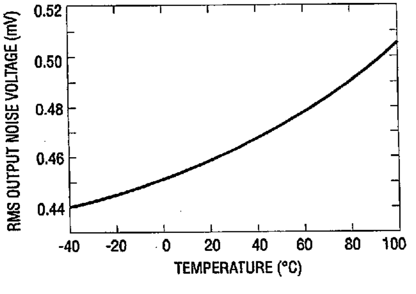


Fig. 4 RMS Input Referred Noise vs Temperature

FIBER127.GR

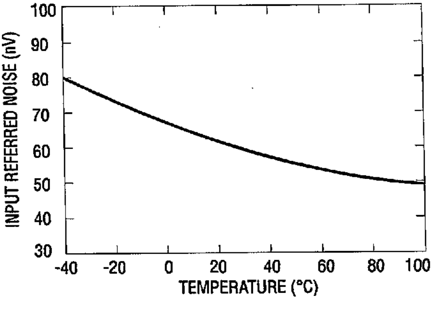


Fig. 5 DC Output Voltage vs Temperature

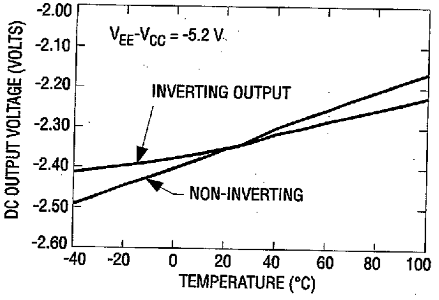


Fig. 6 Pulse Width Distortion vs Optical Input Power