

# HFD3904

## Next Generation 125 MHz PIN Plus Preamp. Analog Receiver

### FEATURES

- Industry standard ST® fiber connector
- High speed operation Rise/Fall times are 3.0 ns typical
- Low pulse-width distortion over a wide range of inputs due to 23 dB typical dynamic range
- Wide variety of cable options, operates with 50/125, 62.5/125, and 100/140  $\mu$ m cables
- Threaded metal barring and housing
- Wave solderable
- Metal package provides enhanced durability and EMI protection over plastic packages
- ST-LP2 package

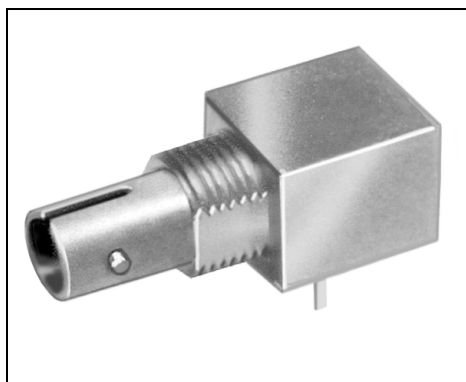
### DESCRIPTION

Next Generation detectors are designed for use in IEEE 802.3 Ethernet and IEEE 802.5J Token Ring applications such as repeaters, bridges, hubs, routers, switches and gateways. This inexpensive, high speed analog fiber optic receiver is intended for use in local area networks (LANs) where data rates up to 125 Mbits/second are needed, and could 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 preamplifier stage of the Next Generation detector converts the current output of the PIN photodiode to a voltage and amplifies it. The output is a linear voltage proportional to the optical input over an input range of less than 1.0  $\mu$ W to 175  $\mu$ W peak (1.313 V typical output voltage swing) providing a dynamic operating range of 23 dB with very low pulse-width distortion.

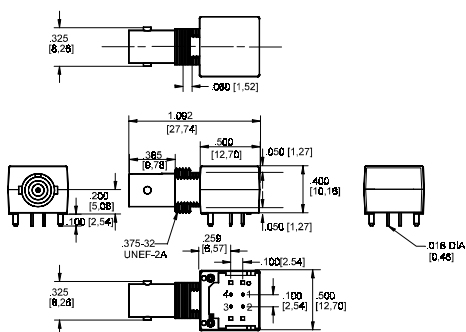
The receivers are designed to operate on the ECL standard of -5.2 volts and have very good Power Supply Rejection Ratio (typically 20 dB at 10 MHz), making them highly immune to noise pickup. They can also be operated with a +5 volt supply although some PSRR performance will be sacrificed at less than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

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



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### OUTLINE DIMENSIONS in inches (mm)



ODIM\_209.cdr

### Pinout

1. Output
2.  $V_{EE}$
3.  $V_{CC}$
4.  $V_{EE}$

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The connector can act as a shield. For optimum EMI shielding, stake pins should be connected to chassis ground. Signal ground and chassis ground should be bridged with a high Q 0.01  $\mu$ F capacitor at the fiber optic component.

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

# Honeywell

# HFD3904

## Next Generation 125 MHz PIN Plus Preamp. Analog Receiver

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### DESCRIPTION (continued)

Next generation detectors are designed to be low cost alternatives to other 125 MHz receivers. They are manufactured with fewer internal components than the previous 125 MHz receivers, and are pin for pin compatible with existing 125 MHz receivers. The metal package provides enhanced durability and EMI shielding over plastic packages.

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## Next Generation 125 MHz PIN Plus Preamp. Analog Receiver

**ELECTRO-OPTICAL CHARACTERISTICS** ( $V_{EE} = -5.2\text{ V}$ ,  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$  unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP <sup>(1)</sup>	MAX	UNITS	TEST CONDITIONS <sup>(2)</sup>
Responsivity $T_A = -25^\circ\text{C}$ Over Temp. Range	R	5.3 4.5	7.5	9.6 11.5	mV/ $\mu\text{W}$	$f = 50\text{ MHz}$ , $P_{IN} = 100\mu\text{W}$ peak, $\lambda = 850\text{ nm}$ , 62.5 $\mu\text{m}$ core fiber
Input Power $T_A = 25^\circ\text{C}$  Over Temp. Range	$P_{IN}$ (peak)			-7.6 175 -8.2 150	dBm $\mu\text{W}$ dBm $\mu\text{W}$	$f = 50\text{ MHz}$ , $\lambda = 850\text{ nm}$ PWD $\leq 2.5\text{ ns}$
DC Output Voltage <sup>(3)</sup>	$V_{ODC}$	-4.2	-3.6	-2.8	V	$P_{IN} \leq 0.1\text{ }\mu\text{W}$ $R_{LOAD} = 0$
Power Supply Current	$I_{CC}$		9	15	mA	
Rise/Fall Time $T_A = 25^\circ\text{C}$ Over Temp. Range	$t_R/t_F$		3.0 3.0	4.5 6.3	ns	$f = 10\text{ MHz}$ , $P_{IN} = 100\mu\text{W}$ peak $\lambda = 850\text{ nm}$
Pulse Width Distortion <sup>(4)</sup>	PWD		0.2	2.5	ns	$f = 50\text{ MHz}$ , $P_{IN} = 150\text{ }\mu\text{m}$ peak, $\lambda = 850\text{ nm}$
Bandwidth	BW		125		MHz	$\lambda = 850\text{ nm}$ , $R = 0.707\text{ R max.}$
RMS Noise Output Voltage	$V_{NO}$		0.52	0.58	mV mV mV	$P_{IN} = 0\text{ }\mu\text{W}$ , 75 MHz, 3 pole Bessel filter on output No filter on output
Output PSRR <sup>(5)</sup>			20		dB	$f = 10\text{ MHz}$
Output Overshoot			10	13	%	$P_{IN} = 10\text{ }\mu\text{W}$
Output Resistance			20		$\Omega$	$f = 50\text{ MHz}$
RMS Input Noise Power <sup>(6)</sup>	$P_{NI}$	-41.3 74	-41.0 79		dBm nW	$P_{IN} = 0\text{ }\mu\text{W}$ , 75 MHz, 3 pole Bessel filter on output

### Notes

1. Typical specifications are for operations at  $T_A = 25^\circ\text{C}$ .
2. Output pin should be AC coupled to a 511  $\Omega$  load. Load capacitance  $< 5\text{ pf}$  (See circuit diagram).
3. Quiescent output voltage  $V_{ODC} = V_{CC} - V_{out}$ . Dynamic output voltage swing is below the quiescent output voltage ( $V_O = V_{ODC} + R \times P_{IN}$ ).
4. Measured at the 50% amplitude point on the output waveform.
5. Output PSRR is defined as  $20\log(V_{supply\text{ Ripple}}/V_{out\text{ Ripple}})$ .
6. Input referred noise is calculated as  $P_{NI} = V_{NO}/R$

### ABSOLUTE MAXIMUM RATINGS

( $T_{case} = 25^\circ\text{C}$  unless otherwise noted)

Storage temperature	-55 to $+85^\circ\text{C}$
Operating temperature	-40 to $+85^\circ\text{C}$
Lead solder temperature	$260^\circ\text{C}$ , 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

Supply voltage ( $V_{CC} - V_{EE}$ )	-0.5 to -6.0 V
Optical signal input	1.0 to 125 $\mu\text{W}$
Operating temperature	0 to $70^\circ\text{C}$

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### ORDER GUIDE

Description	Catalog Listing
Threaded metal barrel and housing	HFD3904-202

### 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.



### CIRCUIT DIAGRAM

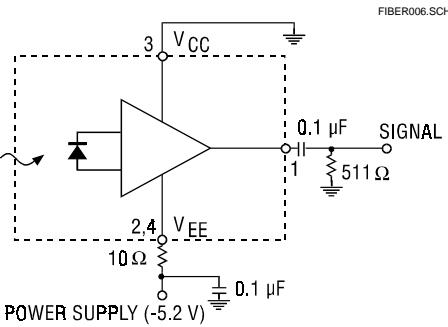
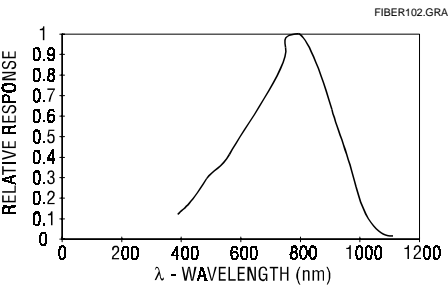


Fig. 1 Spectral Responsivity



### SWITCHING WAVEFORM

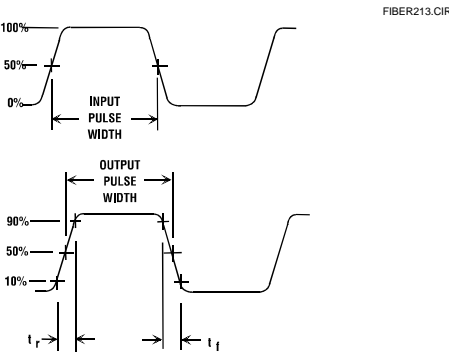
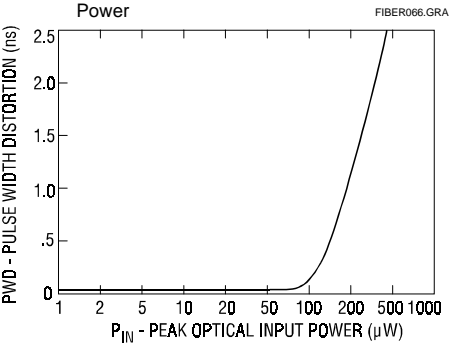


Fig. 2 Pulse Width Distortion vs Optical Input Power



All Performance Curves Show Typical Values