

## Fiber Optic Components

### High-speed TTL Receiver

## HFD7000-2xx

#### FEATURES

- Designed to meet industrial LAN specifications
- Converts optical into electrical signal
- Typical sensitivity @ 660 nm, -21 dBm
- Single 5 V supply
- High speed (dc to 16 Mbps)
- Metal SMA barrel for high mechanical stability (HFD7000-202)
- Separate grounding of the barrel provides excellent RFI/EMI/ESD shielding
- Low-cost plastic version (HFD7000-212) available
- PIN-compatible with Honeywell's HFD3403 5 Mbps receiver

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HFD7000-212



HFD7000-202

#### DESCRIPTION

The HFD7000 series are high-speed optical receivers designed for data transmission in industrial LAN applications. The monolithic CMOS chip consists of a large area photodiode, pre-amplifier with controlled gain, a post amplifier, a comparator, and TTL output stage. The integrated voltage regulator provides easy use in many applications.

The chip's silicon material is optimized for 660 nm operation. The on-chip controlled gain provides a wide dynamic range and low pulse-width distortion (PWD).

The chip is mounted in a metal TO-18 package. In addition, the outer package of the HFD7000-202 has a metal barrel for high mechanical stability and excellent shielding against RFI/EMI and ESD. This feature allows the receiver to operate in harsh environments.

The receiver is designed to work with Honeywell's high-speed 660 nm transmitter, HFE 7000.

#### TYPICAL APPLICATIONS

For maximum performance of this receiver, a 0.1  $\mu$ F capacitor must be mounted between Vcc and Ground no more than 3,0 mm [0.12 in] away from the housing. A 4.7  $\Omega$  resistor in series with Vcc increases the filter's performance. This minimizes external noise and allows the maximum sensitivity to be obtained.

#### WARNING

##### PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices, or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

#### NOTICE

Stress 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.

#### WARNING

##### MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information are supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

## High-speed TTL Receiver

*HFD7000-2xx*

## OPERATION

Optical power (photons) from the fiber strikes the active area of the photodiode and is then converted to an electrical signal. The current is then converted to a voltage in the transimpedance pre-amplifier. The controlled gain limits the light current created by the photodiode in both the transimpedance pre-amplifier and in the post-amplifier. This avoids a possible overcharge of the amplifier and assures optimum PWD performance.

The signal is compared with a threshold defining the system's sensitivity limit. A final buffer provides TTL output. The level-sensitive behavior makes the system robust with respect to external interference (e.g. current/voltage spikes). The regulator supplies the entire system to ensure high rejection to power supply noise.

### ABSOLUTE MAXIMUM RATINGS

(25° C free air temperature unless otherwise noted)

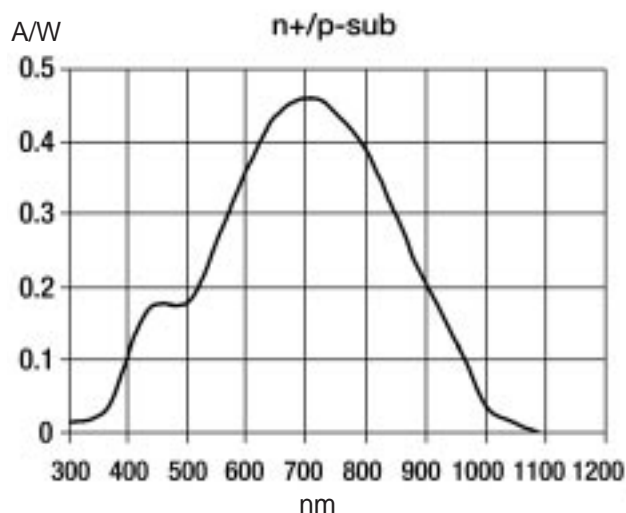
Storage temperature.....-40 °C to 100 °C  
[ -40 °F to 212 °F]

Lead solder temperature...10 sec at 260 °C [500 °F]

Supply voltage.....6 V

Junction temperature.....150 °C [302 °F]

### FIGURE 1. SPECTRAL SENSITIVITY



## RECOMMENDED OPERATING CONDITIONS

Operating temperature.....	0 °C to 70 °C [32 °F to 158 °F]
Supply voltage.....	4.75 V to 5.25 V
Optical input power.....	-20 dBm to -5 dBm

**ELECTRO-OPTICAL CHARACTERISTICS** ( $T_C = 25\text{ }^{\circ}\text{C}$  [77  $^{\circ}\text{F}$ ],  $V_{CC} = 5\text{ V}$  unless noted)

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Units
Data rate		dc			16	Mbps
Current consumption		I <sub>cc</sub>			45	mA
<b>660 nm</b>						
Max received power/optical level LOW	1 mm/POF	P <sub>RmaxL</sub>			-31	dBm
Max received power/optical level HIGH	1 mm/POF	P <sub>RmaxL</sub>			-5	dBm
Max received power/optical level HIGH	1 mm/POF	P <sub>RminH</sub>	-20			dBm
Output voltage high	I <sub>OH</sub> = 2 mA @ 20 pF load	V <sub>OHIGH</sub>	2.4			V
Output voltage low	I <sub>OLow</sub> = 2 mA @ 20 pF load	V <sub>OLow</sub>			0.4	V
Rise time	10% to 90%	t <sub>r</sub>		6	10	ns
Fall time	90% to 10%	t <sub>f</sub>		8	10	ns
Pulse width distortion	f = 8 MHz, 50% duty cycle, P <sub>oIN</sub> = -20 dBm to -5 dBm (average)	PWD			±22	ns
Dynamic range			15			dB
Bit error rate		BER			< 10 <sup>-9</sup>	

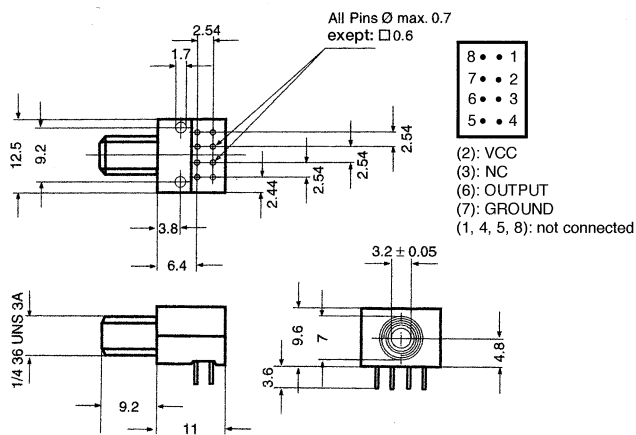
## Fiber Optic Components

### High-speed TTL Receiver

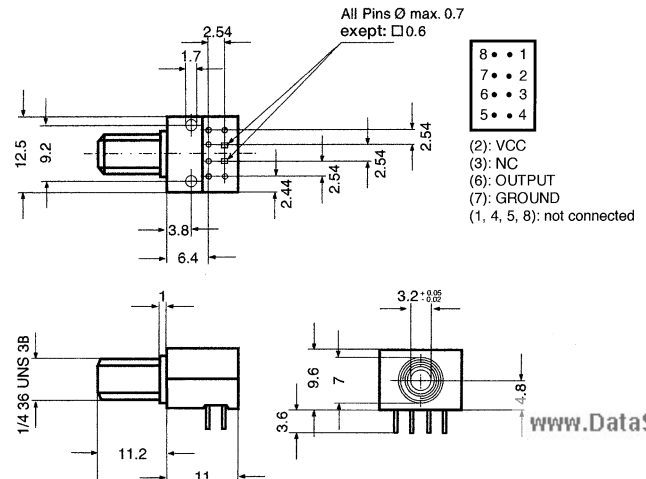
*HFD7000-2xx*

**FIGURE 2. HFD7000-212/215**

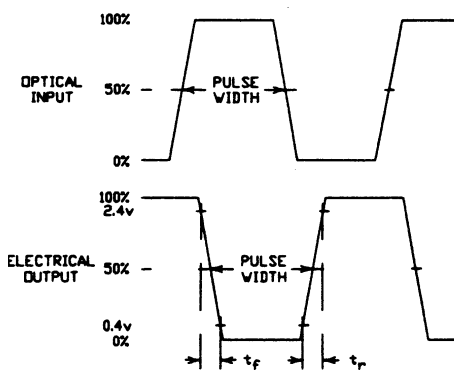
Outline dimensions mm [in] (for reference only)



**FIGURE 3. HFD7000-202**



### FIGURE 4. WAVEFORM



## ORDER GUIDE

Catalog Listing	Description
HFD7000-202	Metal barrel
HFD7000-212	Fiberglass reinforced, non-conductive barrel
HFD7000-215	Carbon-fiber reinforced, conductive barrel

# Fiber Optic Components

## High-speed TTL Receiver

*HFD7000-2xx*

### WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective material and faulty workmanship. Contact your local sales office for warranty information. 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.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

### SALES AND SERVICE

Honeywell serves its customers through a world-wide network of sales offices and distributors.

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact a nearby sales office or call:

### TELEPHONE

Germany	+49(0)89 3581 3310
UK	+44(0) 1698 481 481
USA & Canada	1-800-537-6945
International	1-815-235-6847

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