

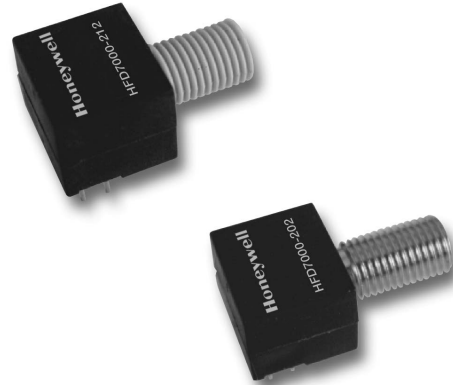
## Fiber Optic Components

### High-speed TTL Receiver

### *HFD7000-2XX Series*

#### FEATURES

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



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, the HFE 7000.

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 maintained.

#### **⚠ 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.**

#### **⚠ 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 is provided in the instructions supplied with each product.

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

# Fiber Optic Components

## High-speed TTL Receiver

## HFD7000-2XX Series

### OPERATION

Optical power (photons) from the fiber strikes the active area of the photodiode and is 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 a TTL output. The level sensitive behavior makes the system robust with respect to the external interference (e.g. current/voltage spikes). The regulator supplies the entire system to ensure high rejection of power supply noise.

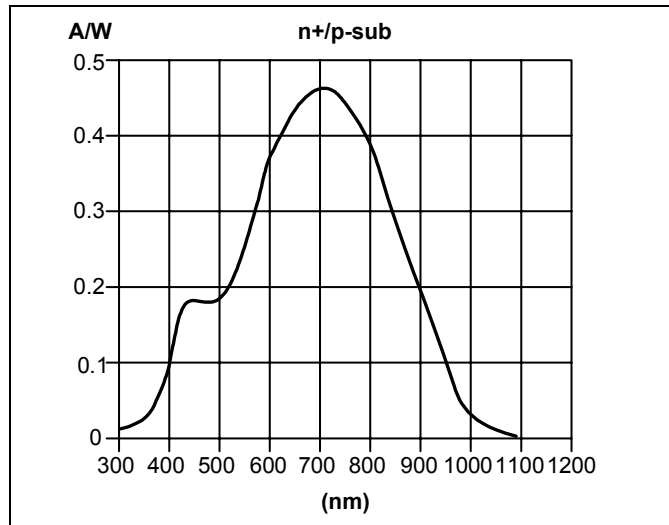
**ABSOLUTE MAXIMUM RATINGS** (25 °C [77 °F] free air temperature unless otherwise noted.)

|                         |                                     |
|-------------------------|-------------------------------------|
| Storage temperature     | -40 °C to 100 °C [-40 °F to 212 °F] |
| Lead solder temperature | 10 s at 260 °C [500 °F]             |
| Supply voltage          | 6 V                                 |
| Junction temperature    | 150 °C [302 °F]                     |

### 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               |

FIGURE 1: SPECTRAL SENSITIVITY



### NOTICE

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

TABLE 1: ELECTRO-OPTICAL CHARACTERISTICS (T<sub>c</sub> = 25 °C [77 °F], V<sub>CC</sub> = 5 V unless noted)

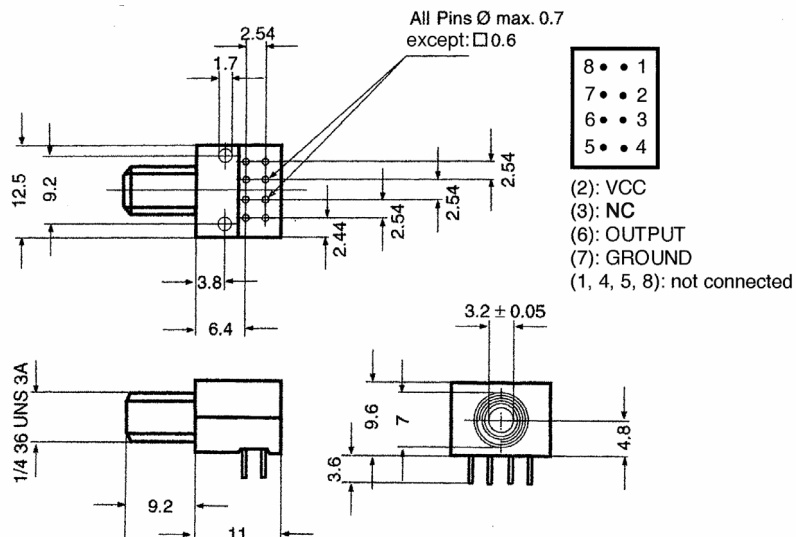
| Parameter                              | Test Condition                                                             | Symbol             | Min. | Typical | Max               | Unit |
|----------------------------------------|----------------------------------------------------------------------------|--------------------|------|---------|-------------------|------|
| Data rate                              | —                                                                          | dc                 | dc   | —       | 16                | Mbps |
| Current consumption                    | —                                                                          | I <sub>CC</sub>    | —    | —       | 45                | mA   |
| 660 nm                                 |                                                                            |                    |      |         |                   |      |
| 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>RmaxH</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>OL</sub> = 2 mA@20 pf load                                          | V <sub>OLOW</sub>  | —    | —       | 0.4               | V    |
| Rise time                              | 10 % - 90 %                                                                | t <sub>r</sub>     | —    | 6       | 10                | ns   |
| Fall time                              | 90 % - 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

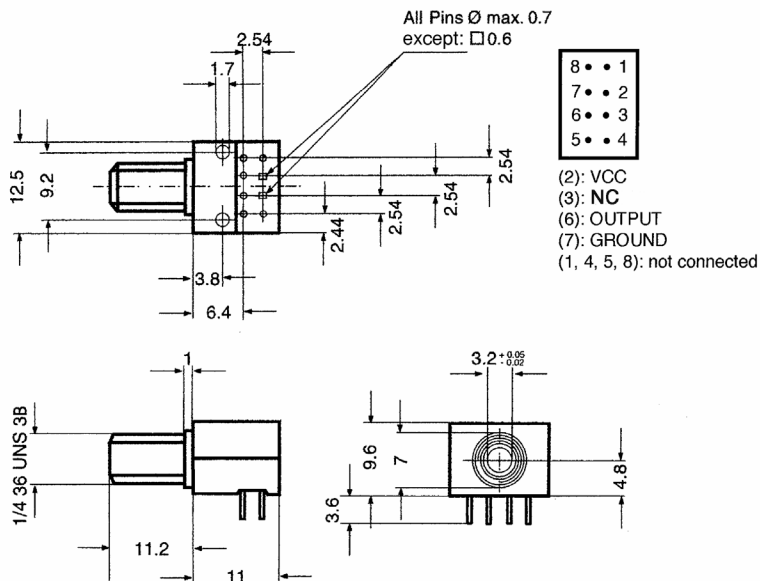
## High-speed TTL Receiver

## HFD7000-2XX Series

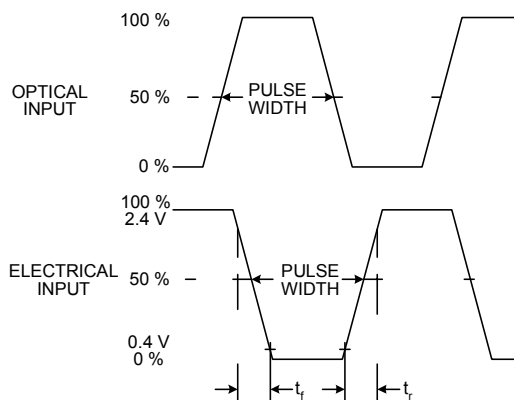
**FIGURE 2. HFD7000-212/215 (For reference only, mm)**



**Figure 3. HFD7000-202 (For reference only, mm)**



**FIGURE 4: Waveform**



# Fiber Optic Components

High-speed TTL Receiver

*HFD7000-2XX Series*

## ORDER GUIDE

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

## WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the 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.** Specifications may change 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.

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

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