

# HOA2003

## Transmissive Optoschmitt Sensor

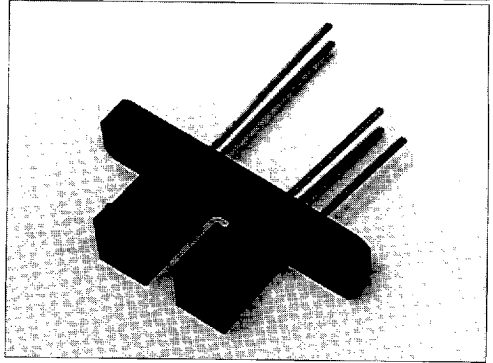
### FEATURES

- Direct TTL interface
- Buffer logic
- 0.010 in.(2.54 mm) offset detector leads
- 0.125 in.(3.18 mm) slot width
- Accurate position sensing
- Dust protective housing

### DESCRIPTION

The HOA2003 consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 k $\Omega$  (nominal) pull-up resistor. The buffer logic provides a high output when the optical path is clear, and a low output when the path is interrupted. The HOA2003 utilizes an IR transmissive polysulfone housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility. The detector has a 0.010 in.(2.54 mm) x 0.040 in.(1.02 mm) vertical aperture which is ideal for use in applications in which maximum position resolution is desired. The HOA2003 employs plastic molded components. For additional component information see SEP8506 and SDP8600.

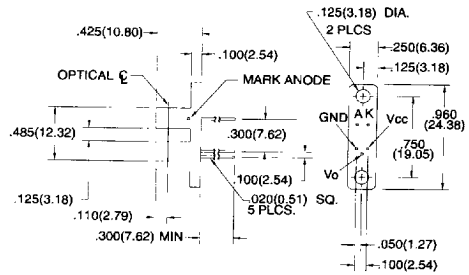
Housing material is polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.



INFRA-42.TIF

### OUTLINE DIMENSIONS in inches (mm)

|           |                |                   |
|-----------|----------------|-------------------|
| Tolerance | 3 plc decimals | $\pm 0.010(0.25)$ |
|           | 2 plc decimals | $\pm 0.020(0.51)$ |



DIM\_064.cdr

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### ELECTRICAL CHARACTERISTIC (25°C unless otherwise noted)

| PARAMETER                      | SYMBOL    | MIN | TYP | MAX | UNITS         | TEST CONDITIONS                          |
|--------------------------------|-----------|-----|-----|-----|---------------|------------------------------------------|
| <b>IR EMITTER</b>              |           |     |     |     |               |                                          |
| Forward Voltage                | $V_F$     |     |     | 1.6 | V             | $I_F=20\text{ mA}$                       |
| Reverse Leakage Current        | $I_R$     |     |     | 10  | $\mu\text{A}$ | $V_R=3\text{ V}$                         |
| <b>DETECTOR</b>                |           |     |     |     |               |                                          |
| Operating Supply Voltage       | $V_{CC}$  | 4.5 |     | 10  | V             | $V_{CC}=5\text{ V}$                      |
| Low Level Supply Current       | $I_{CCL}$ | 4.0 |     | 12  | mA            | $V_{CC}=12\text{ V}$                     |
|                                |           | 5.0 |     | 15  |               | $V_{CC}=5\text{ V}$                      |
| High Level Supply Current      | $I_{CCH}$ | 2.0 |     | 10  | mA            | $V_{CC}=12\text{ V}$                     |
|                                |           | 3.0 |     | 12  |               | $V_{CC}=5\text{ V}$                      |
| Low Level Output Voltage       | $V_{OL}$  |     |     | 0.4 | V             | $I_{OL}=12.8\text{ mA}, I_F=0\text{ mA}$ |
| High Level Output Voltage      | $V_{OH}$  | 2.4 |     |     | V             | $I_{OH}=0, I_F=20\text{ mA}$             |
| Hysteresis <sup>(2)</sup>      | HYST      |     | 10  |     | %             |                                          |
| Propagation Delay, Low-High    | $t_{PLH}$ |     | 5   |     | $\mu\text{s}$ | $V_{CC}=5\text{ V}, I_F=20\text{ mA}$    |
| Propagation Delay, High-Low    | $t_{PHL}$ |     | 5   |     | $\mu\text{s}$ | $V_{CC}=5\text{ V}, I_F=20\text{ mA}$    |
| Rise Time                      | $t_r$     |     | 60  |     | ns            | $R_L=390\ \Omega, C_L=50\text{ pF}$      |
| Fall Time                      | $t_f$     |     | 15  |     | ns            | $R_L=390\ \Omega, C_L=50\text{ pF}$      |
| <b>COUPLED CHARACTERISTICS</b> |           |     |     |     |               |                                          |
| IRE Trigger Current            | $I_{FT}$  |     |     | 20  | mA            | $V_{CC}=5\text{ V}$                      |
| HOA2003-001                    |           |     |     |     |               |                                          |

#### Notes

1. It is recommended that a bypass capacitor, 0.1  $\mu\text{F}$  typical, be added between  $V_{CC}$  and GND near the device in order to stabilize power supply line.

2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

### ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

|                               |               |
|-------------------------------|---------------|
| Operating Temperature Range   | -40°C to 70°C |
| Storage Temperature Range     | -40°C to 85°C |
| Soldering Temperature (5 sec) | 240°C         |

#### IR EMITTER

|                            |                       |
|----------------------------|-----------------------|
| Power Dissipation          | 100 mW <sup>(1)</sup> |
| Reverse Voltage            | 3 V                   |
| Continuous Forward Current | 50 mA                 |

#### DETECTOR

|                             |                     |
|-----------------------------|---------------------|
| Supply Voltage              | 12 V <sup>(2)</sup> |
| Output Sink Current         | 18 mA               |
| Duration of Output          |                     |
| Short to $V_{CC}$ or Ground | 1.0 sec.            |

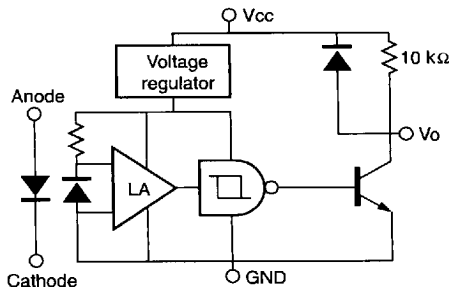
#### Notes

1. Derate linearly at 0.78 mW/°C above 25°C.

2. Derate linearly from 25°C to 5.5 V at 70°C

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

### SCHEMATIC



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SWITCHING WAVEFORM

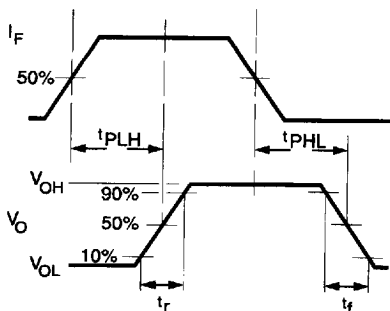
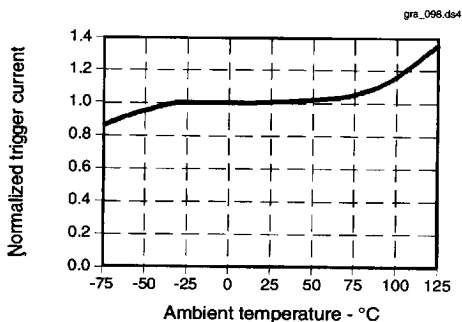
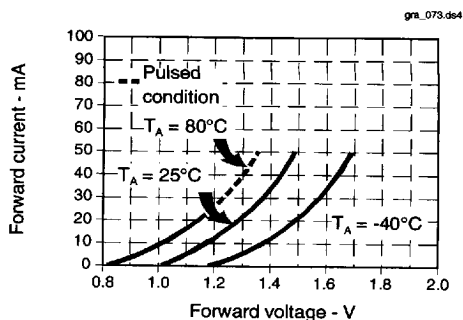


Fig. 2 IRED Trigger Current vs Temperature



All Performance Curves Show Typical Values

Fig. 1 IRED Forward Bias Characteristics



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