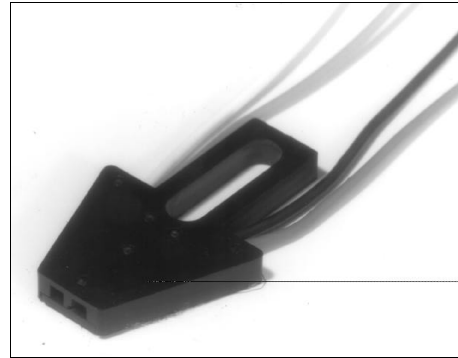


# HOA1406

## Reflective Sensor

### FEATURES

- Choice of phototransistor or photodarlington output
- Low profile package
- Hermetic style emitter and detector
- Focused for maximum response
- 24.0 in.(610 mm) min. 26 AWG Teflon insulated lead wires



INFRA-84.TIF

### DESCRIPTION

The HOA1406 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1406- 001) or photodarlington (HOA1406- 003) encased side- by- side on converging optical axes, in a black thermoplastic housing. The detector responds to radiation from the IRED only when a reflective object passes within its field of view. This low profile sensor is ideally suited for applications where space is limited, or stacking of sensors is required. The HOA1406 series employs hermetically sealed metal can packaged components. For additional component information see SE2460, SD2440, SD2410.

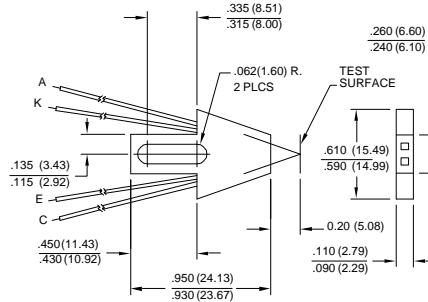
Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

Wire color code and functions are:

- IRED anode - red
- IRED cathode - black
- Collector - white
- Emitter - green

### OUTLINE DIMENSIONS in inches (mm)

Tolerance 3 plc decimals ±0.010(0.25)  
2 plc decimals ±0.020(0.51)



DIM\_072.d54

# HOA1406

## Reflective Sensor

### ELECTRICAL CHARACTERISTICS (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>                      |               |     |     |     |               |                                       |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ |     |     |     | V             | $I_C=100\ \mu\text{A}$                |
| HOA1406-001                          |               | 30  |     |     |               |                                       |
| HOA1406-003                          |               | 15  |     |     |               |                                       |
| Emitter-Collector Breakdown Voltage  | $V_{(BR)ECO}$ | 5.0 |     |     | V             | $I_E=100\ \mu\text{A}$                |
| Collector Dark Current               | $I_{CEO}$     |     |     |     | nA            | $V_{CE}=10\text{ V}, I_F=0$           |
| HOA 1406-001                         |               |     |     | 100 |               |                                       |
| HOA1406-003                          |               |     |     | 250 |               |                                       |
| <b>COUPLED CHARACTERISTICS</b>       |               |     |     |     |               |                                       |
| On-State Collector Current           | $I_{C(ON)}$   |     |     |     | $\mu\text{A}$ | $V_{CE}=5\text{ V}$                   |
| HOA1406-001                          |               | 25  |     |     | mA            | $I_F=40\text{ mA}$                    |
| HOA1406-003                          |               | 2.0 |     |     |               | <sup>(1)</sup>                        |
| Crosstalk <sup>(2)</sup>             | $I_{CX}$      |     |     | 2.0 | $\mu\text{A}$ | $V_{CE}=5\text{ V}, I_F=40\text{ mA}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ |     |     |     | V             | $I_F=40\text{ mA}$ <sup>(1)</sup>     |
| HOA1406-001                          |               |     |     | 0.4 |               | $I_C=10\ \mu\text{A}$                 |
| HOA1406-003                          |               |     |     | 1.1 |               | $I_C=1\text{ mA}$                     |
| Rise And Fall Time                   | $t_r, t_f$    |     |     |     | $\mu\text{s}$ | $V_{CC}=5\text{ V}, I_C=1\text{ mA}$  |
| HOA1406-001                          |               |     | 15  |     |               | $R_L=1000\ \Omega$                    |
| HOA1406-003                          |               |     | 75  |     |               | $R_L=100\ \Omega$                     |

#### Notes

1. Test surface is a Eastman Kodak neutral white card with 90% diffuse reflectance located 0,20 in. (5,0 mm) from the front surface of the device.
2. Crosstalk ( $I_{CX}$ ) is the collector current measured with current to emitter and no reflecting surface.

### ABSOLUTE MAXIMUM RATINGS

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

Operating Temperature Range -40°C to 100°C  
Storage Temperature Range -40°C to 100°C

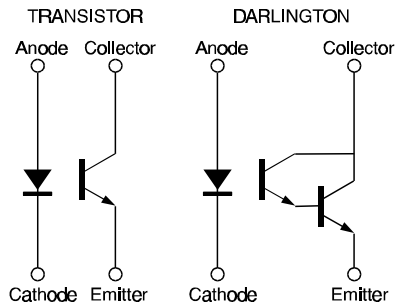
#### IR EMITTER

Power Dissipation 80 mW <sup>(1)</sup>  
Reverse Voltage 3 V  
Continuous Forward Current 50 mA

#### DETECTOR

|                           | TRANS.               | DARLINGTON           |
|---------------------------|----------------------|----------------------|
| Collector-Emitter Voltage | 30 V                 | 15 V                 |
| Emitter-Collector Voltage | 5 V                  | 5 V                  |
| Power Dissipation         | 75 mW <sup>(2)</sup> | 75 mW <sup>(2)</sup> |
| Collector DC Current      | 30 mA                | 30 mA                |

### SCHEMATIC



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

# Honeywell

257

# HOA1406

## Reflective Sensor

Fig. 1 IRED Forward Bias Characteristics

gra\_073.ds4

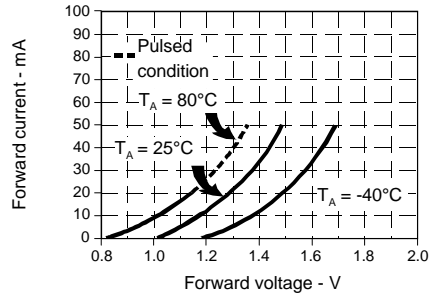


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra\_079.ds4

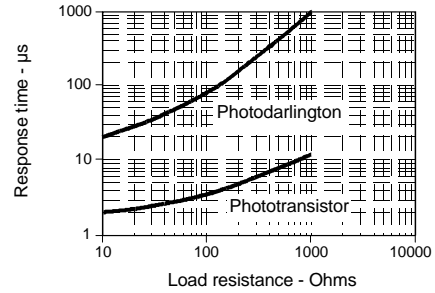


Fig. 3 Dark Current vs Temperature

gra\_301.cdr

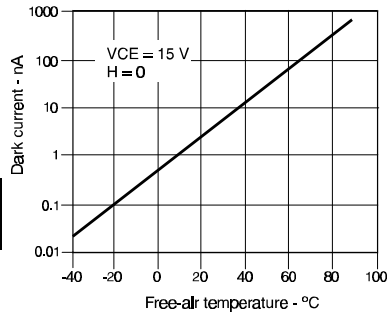


Fig. 4 Collector Current vs Ambient Temperature

gra\_076.ds4

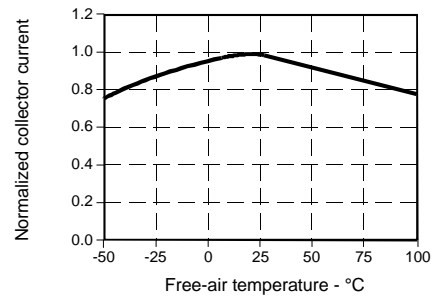


Fig. 5 Collector Current vs Distance to Reflective Surface

gra\_210.ds4

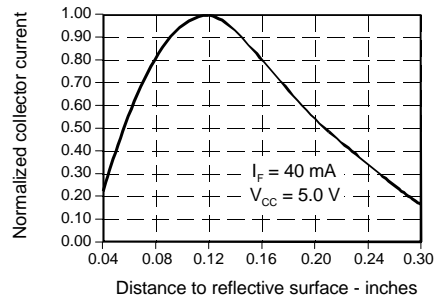
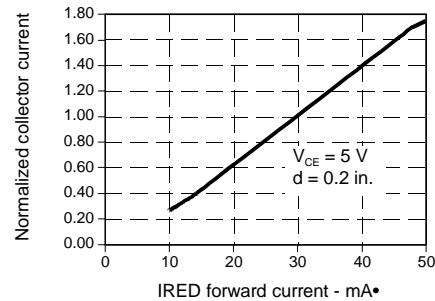


Fig. 6 Collector Current vs IRED Forward Current

gra\_209.ds4



All Performance Curves Show Typical Values

# HOA1406

Reflective Sensor

---



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

**Honeywell**

259