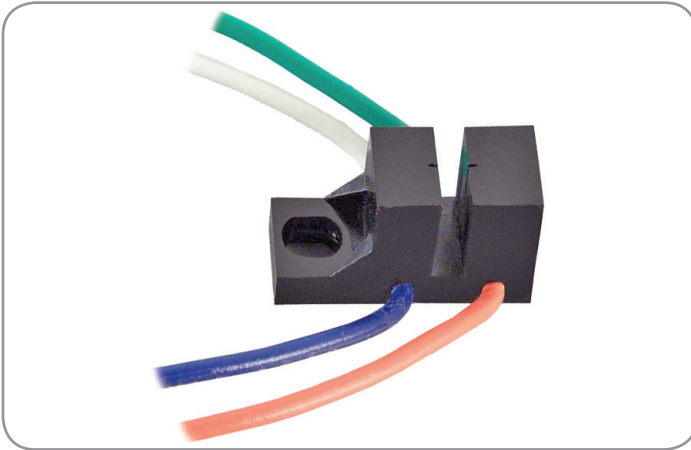


Infrared Transmissive Sensors HOA1870 Series

32322405
Issue A

Datasheet



DESCRIPTION

The HOA1870 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1870-031) or photodarlington (HOA1870-033) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. Lead wires provide an alternate electrical connection when PC board mounting is not possible. This device is ideal for use in applications in which maximum position resolution is desired. Both emitter and detector have narrow 0,152 mm [0.006 in] x 1,02 mm [0.040 in] vertical apertures. The HOA1870 series employs plastic molded components. Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

VALUE TO CUSTOMERS

- Non-contact sensing
- Replacement for mechanical switch
- Long-life operation

FEATURES

- Choice of phototransistor or photodarlington output
- Accurate position sensing via narrow vertical apertures
- 1,78 mm [0.070 in] slot width
- 457 mm [18.0 in] min. 26 AWG UL 1007 wire leads

POTENTIAL APPLICATIONS

- Rotary or linear speed and position
- Precision edge detection
- End of travel flag sensor

PORTFOLIO

The HOA1870 Series is a part of Honeywell's family of Transmissive Infrared Sensors.

Infrared Transmissive Sensors

HOA1870 Series

Table 1. Electrical Specifications (At $V_s = 25\text{ }^\circ\text{C}$ [77 °F] except where otherwise specified.)

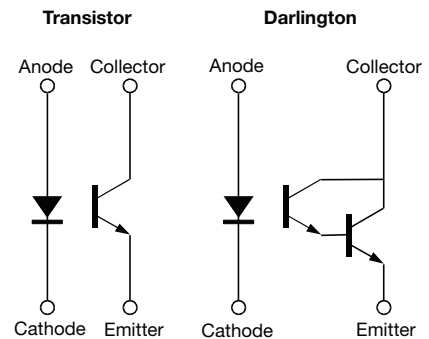
| Characteristic | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---------------|------------|----------|------------|---------------|---|
| IR Emitter | | | | | | |
| Forward voltage | V_F | — | — | 1.6 | V | $I_F = 20\text{ mA}$ |
| Reverse leakage current | I_R | — | — | 10 | μA | $V_R = 3\text{ V}$ |
| Peak wavelength | λ | — | 940 | — | nm | — |
| Detector | | | | | | |
| Collector-emitter breakdown voltage: HOA1870-031 HOA1870-033 | $V_{(BR)CEO}$ | 30 15 | — — | — — | V | $I_C = 100\text{ }\mu\text{A}$ |
| Emitter-collector breakdown voltage | $V_{(BR)ECO}$ | 5.0 | — | — | V | $I_E = 100\text{ }\mu\text{A}$ |
| Collector dark current: HOA1870-031 HOA1870-033 | I_{CEO} | — — | — — | 100 250 | nA | $V_{CE} = 5\text{ V}, I_F = 0$ |
| Coupled Characteristics | | | | | | |
| On-state collector current: HOA1870-031 HOA1870-033 | $I_{C(ON)}$ | 0.3 2.0 | — — | — — | mA | $V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$ |
| Collector-emitter saturation voltage: HOA1870-031 HOA1870-033 | $V_{CE(SAT)}$ | — — | — — | 0.4 1.1 | V | $I_F = 20\text{ mA}, I_C = 40\text{ }\mu\text{A}, I_C = 250\text{ }\mu\text{A}$ |
| Rise and fall time: HOA1870-031 HOA1870-033 | t_r, t_f | — — | 15 75 | — — | μs | $V_{CC} = 5\text{ V}, I_C = 1\text{ mA}, R_L = 1000\text{ Ohm}, R_L = 100\text{ Ohm}$ |

Table 2. Absolute Maximum Specifications (25 °C [77 °F] Free-air temperature unless otherwise noted.)

| Characteristic | Parameter |
|----------------------------------|------------------------------------|
| Operating temperature range | -40 °C to 85 °C [-40 °F to 185 °F] |
| Storage temperature range | -40 °C to 85 °C [-40 °F to 185 °F] |
| Soldering temperature and time | 256 °C [493 °F] for 5 s |
| IR Emitter: | |
| power dissipation ¹ | 100 mW |
| reverse voltage | 3 V |
| continuous forward current | 50 mA |
| Detector: | |
| collector-emitter voltage: | |
| transistor | 30 V |
| photodarlington | 15 V |
| emitter-collector voltage: | |
| transistor, photodarlington | 5 V |
| power dissipation ¹ : | |
| transistor, photodarlington | 100 mW |
| Collector dc current: | |
| transistor, photodarlington | 30 mA |

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

Figure 1. Schematic



Infrared Transmissive Sensors HOA1870 Series

Figure 2. Outline Dimensions (mm/[in] For reference only.)

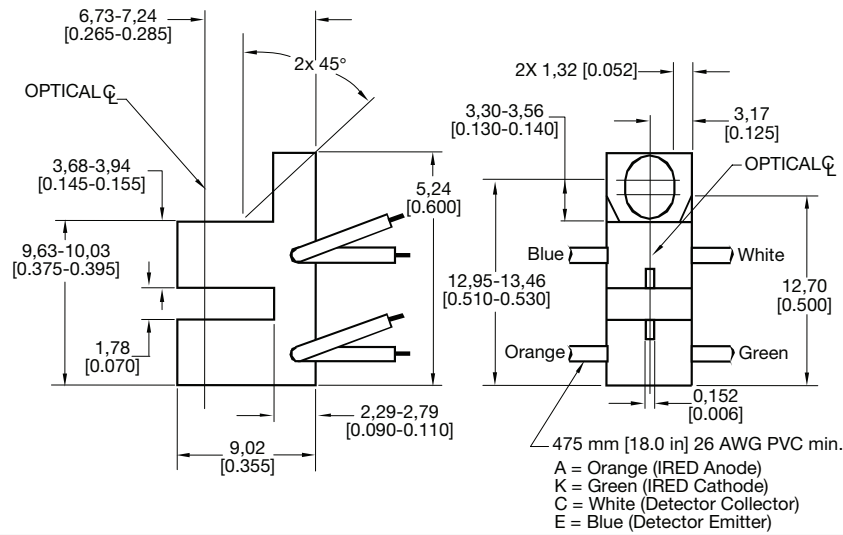
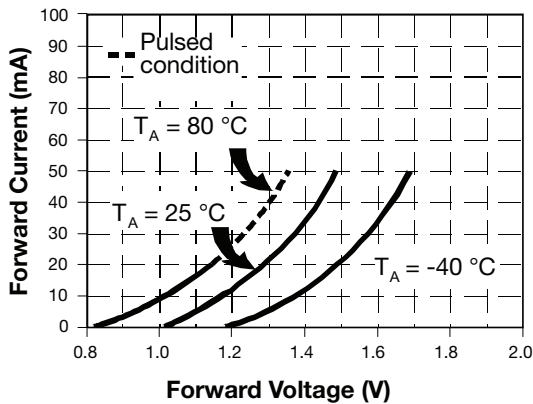
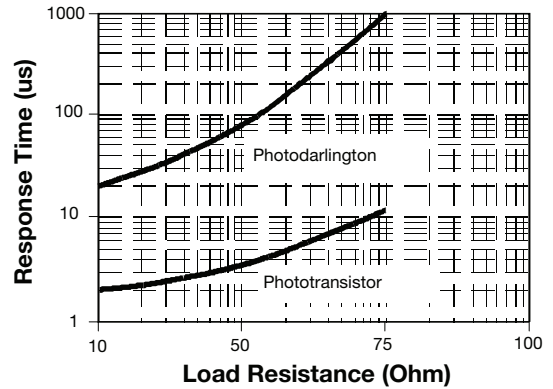


Figure 3. Performance Graphics

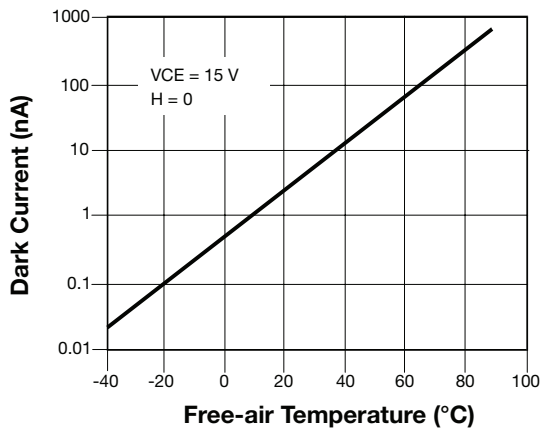
IRED Forward Bias Characteristics



Non-saturated Switching Time vs Load Resistance



Dark Current vs Temperature



Collector Current vs Ambient Temperature

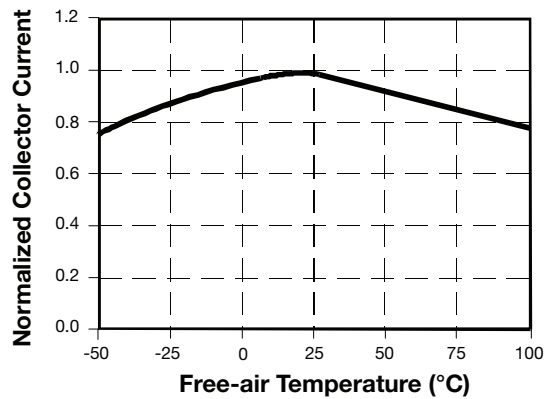


Table 3. Order Guide

| Catalog Listing | Description |
|-----------------|---|
| HOA1870-031 | HOA1870 Series transmissive sensor, NPN silicon phototransistor |
| HOA1870-033 | HOA1870 Series transmissive sensor, photodarlington |

ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Product line guide
- Product range guide

⚠ 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 datasheet 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.

Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors.

For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

To learn more about Honeywell Sensing and Productivity Solutions' products, call **+1-815-235-6847** or **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.sc@honeywell.com**

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