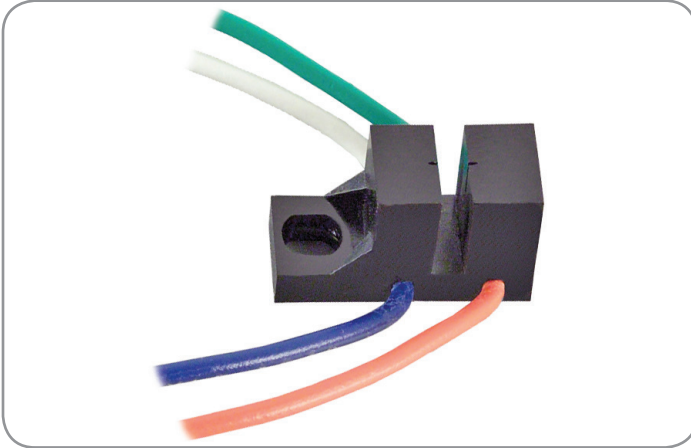


## Infrared Transmissive Sensors HOA1870 Series

**32322405**  
Issue A

Datasheet



### 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

### 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



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# Infrared Transmissive Sensors

## HOA1870 Series

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

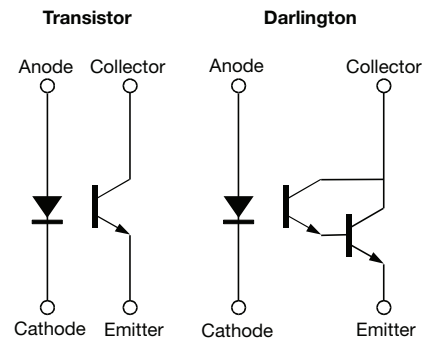
Characteristic	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>IR Emitter</b>						
Forward voltage	$V_F$	—	—	1.6	V	$I_F = 20\text{ mA}$
Reverse leakage current	$I_R$	—	—	10	$\mu\text{A}$	$V_R = 3\text{ V}$
Peak wavelength	$\lambda$	—	940	—	nm	—
<b>Detector</b>						
Collector-emitter breakdown voltage: HOA1870-031 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	$V_{CE} = 5\text{ V}, I_F = 0$
<b>Coupled Characteristics</b>						
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	— —	$\mu\text{s}$	$V_{CC} = 5\text{ V}, I_C = 1\text{ mA}, R_L = 1000\text{ Ohm}, R_L = 100\text{ Ohm}$

**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 <sup>1</sup>	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 <sup>1</sup> :	
transistor, photodarlington	100 mW
Collector dc current:	
transistor, photodarlington	30 mA

<sup>1</sup>Derate 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.)

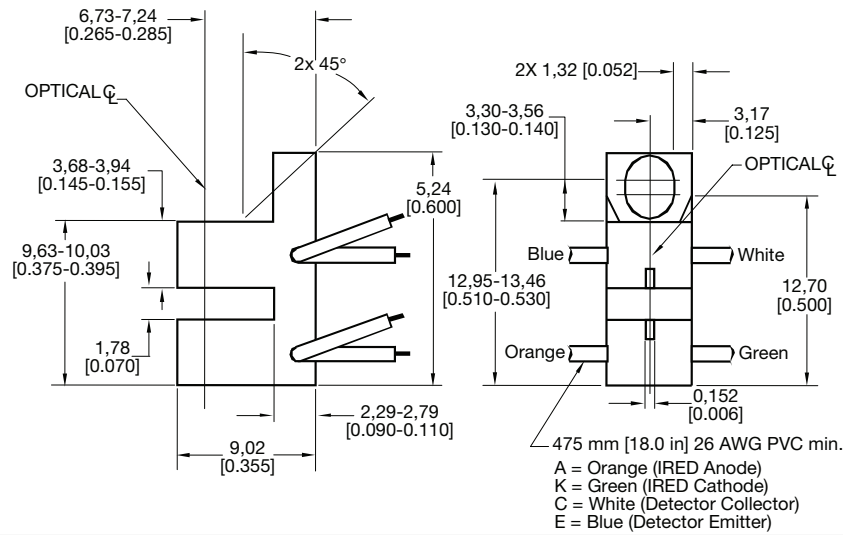
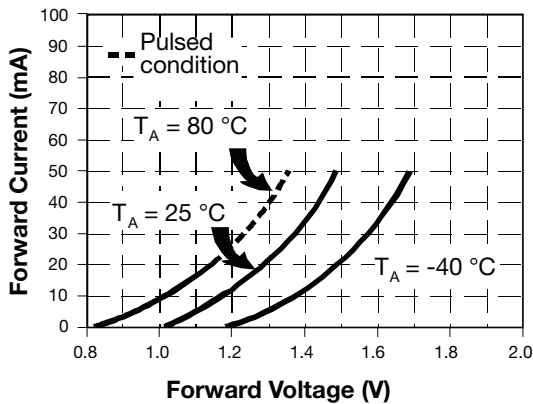
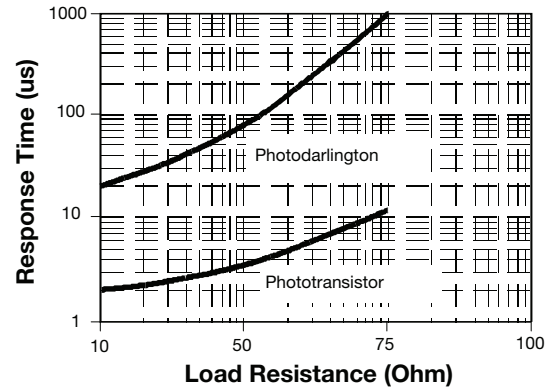


Figure 3. Performance Graphics

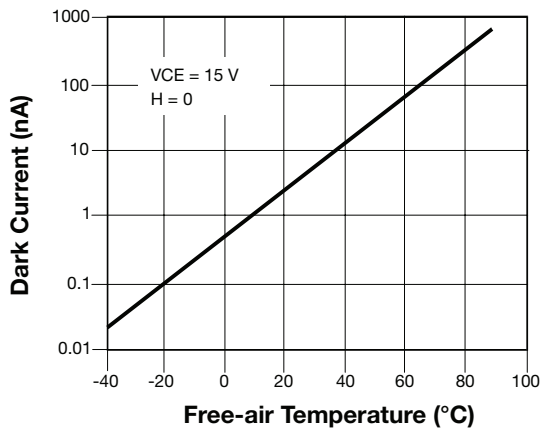
## IRED Forward Bias Characteristics



## Non-saturated Switching Time vs Load Resistance



## Dark Current vs Temperature



## Collector Current vs Ambient Temperature

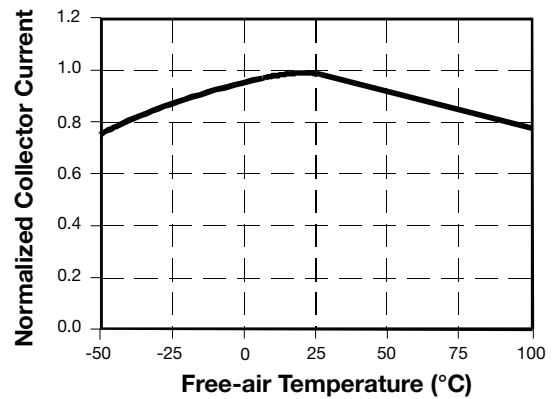


Table 3. Order Guide

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

**⚠ 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.**

**Warranty/Remedy**

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, 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. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While Honeywell may 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 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.

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