

# HOA0901

## Transmissive Encoder Sensor

### FEATURES

- Dual channel IC
- Direct TTL interface
- Inverting logic output
- Resolution to 0.009 in.(.229 mm)
- Internal temperature compensation
- 0.126 in.(3.2 mm) slot width
- Two mounting configurations

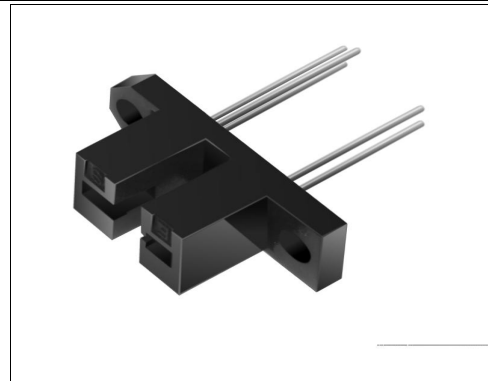
### DESCRIPTION

The HOA0901 sensor consists of a dual channel IC detector and an IRED encased in a black thermoplastic housing. The device is typically used with an interrupter strip or disk (code wheel) to encode the rate and direction of mechanical motion. Applications include linear and rotary encoders; it is especially suited for the encoding function in an optical mouse. As the interruptive pattern moves, the detector generates two output signals which can be processed to provide speed and direction information.

The detector is a monolithic IC which consists of two narrow adjacent photodiodes, amplifiers, and Schmitt trigger output stages. The outputs are NPN collectors with internal 10 k $\Omega$  (nominal) pull-up resistors to V<sub>cc</sub> which are capable of directly driving TTL loads. The IC design incorporates circuitry to compensate the sensitivity for the output power vs. temperature characteristic of the IRED. The sensing areas of the IC are each 0.008 in.(.203 mm) in width and .015 in.(.381mm) in height with a 0.001 in.(.0254 mm) separation for a center- to- center spacing of 0.009 in.(.229 mm) and outside edge to edge distance of 0.017 in.(.432 mm). The device is designed to operate with an encoder period as small as 0.036 in.(.914 mm) and, with proper processing logic, can resolve motion to 0.009 in.(.229 mm).

Two package styles are available. HOA0901- 011 is primarily intended for direct PCB mounting. HOA0901- 012 has mounting tabs for chassis mounting. The HOA0901 series employs plastic molded components. For additional component information see SEP8506 and HLC2701.

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

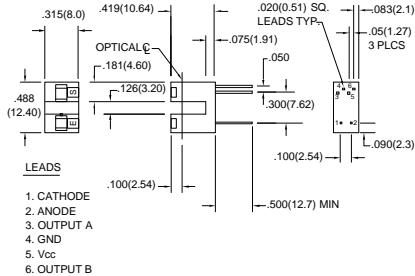


INFRA-78.TIF

### OUTLINE DIMENSIONS in inches (mm)

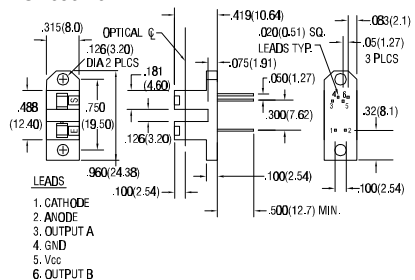
Tolerance	3 plc decimals	$\pm 0.010(0.25)$
	2 plc decimals	$\pm 0.020(0.51)$

#### HOA0901-011



DIM\_059.ds4

#### HOA0901-012



DIM\_59b.ds4

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## Transmissive Encoder 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>						
Operating Supply Voltage	$V_{CC}$	4.5		5.5	V	
Supply Current	$I_{CC}$			7.0	mA	$V_{CC}=5.25\text{ V}$
High Level Output Voltage (A and B)	$V_{OH}$	4.5			V	$V_{CC}=5\text{ V}$ , $I_{OH}=0$ , $I_F=0$
Low Level Output Voltage (A and B)	$V_{OL}$			0.4	V	$V_{CC}=5\text{ V}$ , $I_{OL}=1.6\text{ mA}$ , $I_F=15\text{ mA}$
Internal Pull-up Resistor (A and B)	$R_{INT}$	5	10	20	$k\Omega$	
Propagation Delay, Low-High, High-Low	$t_{PLH}$ , $t_{PHL}$		5		$\mu\text{s}$	$V_{CC}=5\text{ V}$ , $R_L=1\text{ k}\Omega$
Output Rise Time, Output Fall Time	$t_r$ , $t_f$		100		ns	$V_{CC}=5\text{ V}$ , $R_L=1\text{ k}\Omega$
<b>COUPLED CHARACTERISTICS</b>						
IRET Trigger Current HOA0901-011, -012	$I_{FT}$			15	mA	$V_{CC}=5\text{ V}$

#### 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.

### 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	5.5 V
Duration of Output Short to $V_{CC}$ or Ground	1.0 sec.

#### Notes

1. Derate linearly 0.75 mW/°C above 25°C.

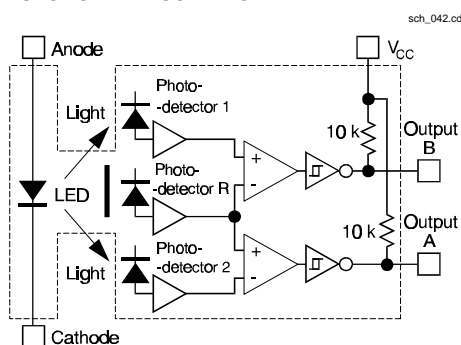
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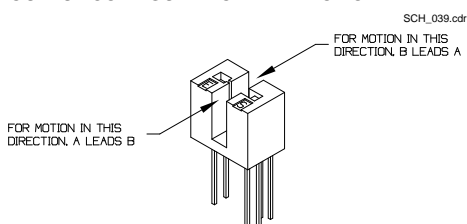
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## Transmissive Encoder Sensor

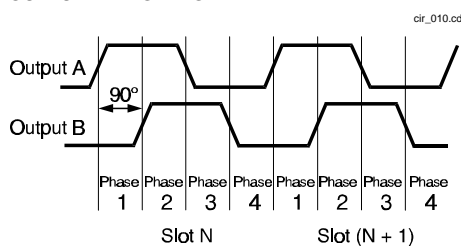
### FUNCTIONAL BLOCK DIAGRAM



### OUTPUT CONFIGURATION WITH MOTION



### OUTPUT TIMING DIAGRAM



### SWITCHING WAVEFORM

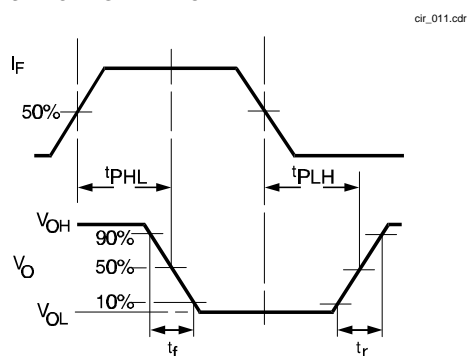


Fig. 1 IRED Forward Bias Characteristics

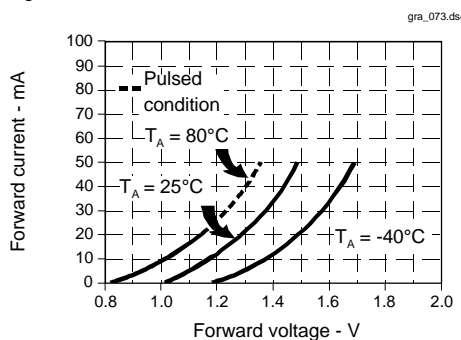
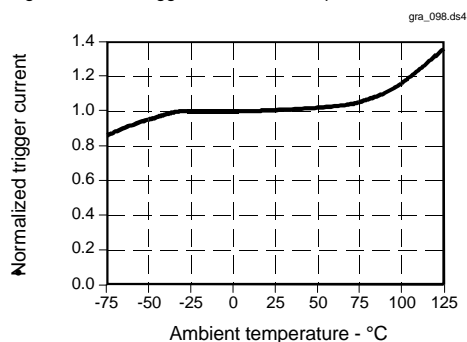


Fig. 2 IRED Trigger Current vs Temperature



All Performance Curves Show Typical Values

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