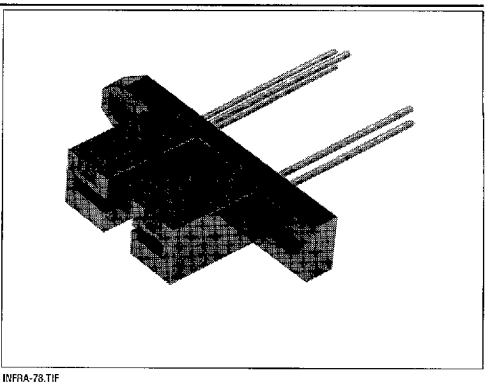
HOA0902

Transmissive Encoder Sensor

FEATURES

- Dual channel IC
- Direct TTL interface
- Resolution to 0.018 in.(.457)
- Internal temperature compensation
- 0.126 in.(3.2 mm) slot width
- Two mounting configurations



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DESCRIPTION

The HOA0902 assembly 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.

The detector is a monolithic IC which consists of two narrow adjacent photodiodes, amplifiers stages and quadrature logic circuitry which provides two outputs; (1) a fixed-duration, low level active tachometer (counting) pulse which is generated whenever the illumination level passes through the sensing threshold, and (2) a direction output which is set to a logic high or low level dependent on which of the two channels is illuminated first. The tachometer output is an NPN collector which is internally connected to V_{CC} through a 10 kΩ (nominal) resistor; the direction output is a totem-pole configuration. Both outputs 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.

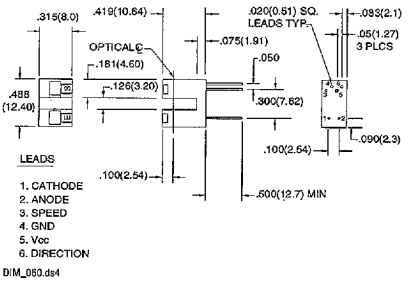
The tachometer pulse is generated at both the increasing and decreasing illumination thresholds of the sensing channel, resulting in two tach pulses for each mechanical period of the interrupter. For designing the slot interruptor refer to the "Optical Encoding with HOA0901 and HOA0902..." application note. For additional component information see SEP8506 and HCL2705.

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

OUTLINE DIMENSIONS in inches (mm)

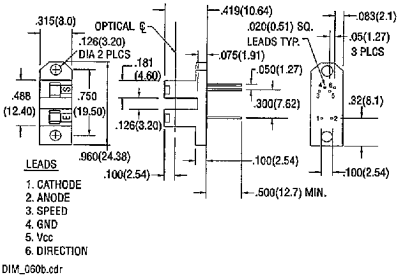
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

HOA0902-011



DIM_060.ds4

HOA0902-012



DIM_060b.cdr

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ELECTRICAL CHARACTERISTIC (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		5.5	V	
Supply Current	I_{CC}			12	mA	V_{CC}=5.25 V
Tach Output, inactive	$V_{OL,TACH}$	4.5			V	V_{CC}=5 V, I_{OH}=0
Tach Pulse Level, active				0.4	V	V_{CC}=5 V, I_{OL}=1.6 mA
Direction Output, B leads A	$V_{OH,DIR}$	2.4			V	V_{CC}=5 V, I_{OH}=-10 µA
Direction Output, A leads B	$V_{OL,DIR}$			0.4	V	V_{CC}=5 V, I_{OL}=1.6 mA
Tach Pulse Width	T_{PW}	3.0		20	µs	V_{CC}=5 V, I_{OL}=1.6 mA
COUPLED CHARACTERISTICS						
IRED Trigger Current HOA0902-011, -012	I_{FT}			15	mA	V_{CC}=5 V

Notes
1. It is recommended that a bypass capacitor, 0.1 µF 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 (1)
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 0.78 mW/°C above 25°C.

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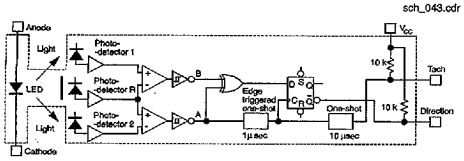
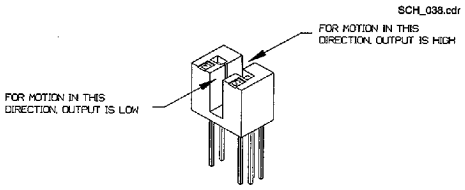
FUNCTIONAL BLOCK DIAGRAM



OUTPUT CONFIGURATION WITH MOTION



OUTPUT TIMING DIAGRAM

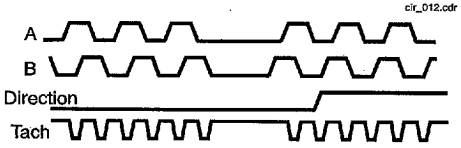


Fig. 1 IRED Forward Bias Characteristics

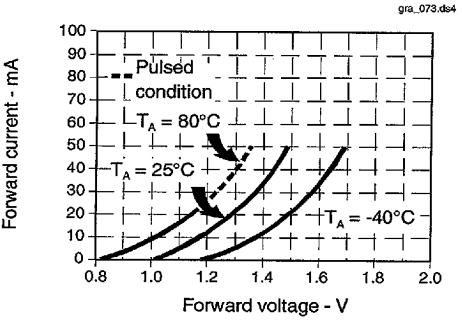
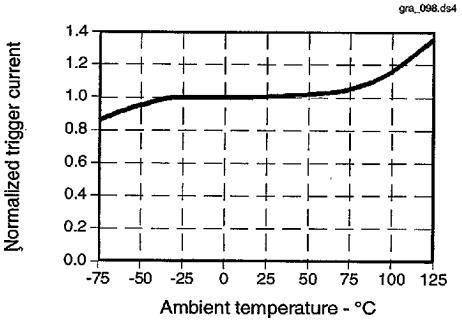


Fig. 2 IRED Trigger Current vs Temperature



All Performance Curves Show Typical Values