### HLC2701 Encoder Detector

#### FEATURES

DESCRIPTION

- Side-looking plastic package
- TTL/LSTTL/CMOS compatible
- Inverting logic output
- · Linear or rotary encoder applications
- Resolution to 0.009 in.(.229 mm)
- · Sensitivity versus temperature compensation
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes

The HLC2701 detector is designed to sense speed and

rotary and linear encoders; the device is especially well suited for the encoding function in an optical mouse. The detector is a monolithic IC, consisting of two narrow

direction of mechanical motion. Applications include

adjacent photodiodes, amplifiers, and Schmitt trigger

internal 10 k $\Omega$  (nominal) pull- up resistors to V\_{CC} which

can directly drive TTL loads. It incorporates circuitry to

compensate the sensitivity for the output power versus

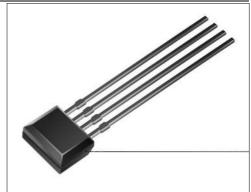
temperature characteristics of an IRED. The IC is

encapsulated in a molded, unlensed black plastic

package which is transmissive to IR energy, yet

provides shielding from visible light.

output stages. The outputs are NPN collectors with

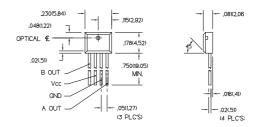


INFRA-74.TIF

#### OUTLINE DIMENSIONS in inches (mm)

Tolerance

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



In a typical application, the HLC2701 is used in conjunction with an IRED and an encoder disk or linear encoder strip attached to an element for which speed and direction of movement is to be sensed. As the interruptive pattern moves, the sensor provides two phase shifted output signals (active low) which can be processed to provide the speed and direction information.

The sensing areas of the IC are each 0.008 in.(.203 mm) in width and in .015in.(.381 mm) in height with a 0.001 in.(.0254 mm) separation, for center- to- center spacing of 0.009 in.(.203 mm), and outside edge to edge distance of 0.017 in.(.432 mm).

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# **HLC2701**

**Encoder Detector** 

#### ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	Vcc	4.5		5.5	V	
Turn-on Threshold Irradiance (2)	Eet(+)				mW/cm <sup>2</sup>	Vcc=5 V
HLC2701-001		0.05		2.0		T <sub>A</sub> =25°C
Hysteresis (3)	HYST		28		%	
Supply Current	lcc			7.0	mA	Vcc=5.25 V
High Level Output Voltage (A and B)	Vон	2.4			V	V <sub>cc</sub> =5 V Іон=0, Ее=0
Low Level Output Voltage (A and B)	Vol			0.4	V	V <sub>CC</sub> =5 V, I <sub>OL</sub> =1.6 mA E <sub>E</sub> =2.0 mW/cm²
Internal Pull-Up Resistor	RINT	5.0	10.0	20.0	kΩ	
Operate Point Temperature Coefficient	Ортс		-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time, Output Fall Time	t <sub>r</sub> , t <sub>f</sub>		100		ns	Vcc=5 V R <sub>L</sub> =1 kΩ T <sub>A</sub> =25°C
Propagation Delay, Low-High, High-Low	tplh, tphl		5.0		μs	V <sub>CE</sub> =5 V R <sub>L</sub> =1 kΩ T <sub>A</sub> =25°C

Notes 1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V<sub>CC</sub> and GND near the device in order to stabilize

The radiation source is an IRED with a peak wavelength of 880 nm.
Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

#### **ABSOLUTE MAXIMUM RATINGS**

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

Duration of Output Short to  $V_{\mbox{\scriptsize CC}}$  or Ground **Operating Temperature Range** 

Storage Temperature Range

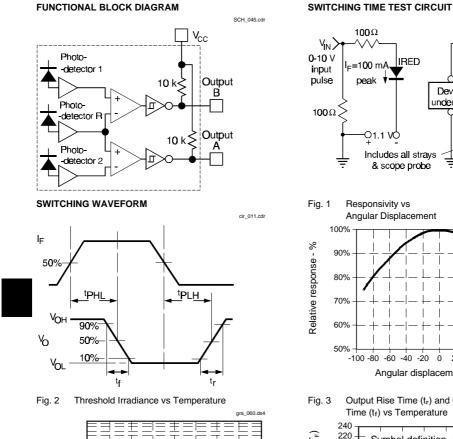
Soldering Temperature (5 sec)

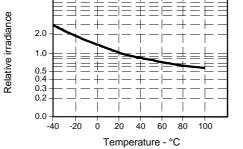
1.0 sec. -40°C to 85°C -40°C to 85°C 240°C

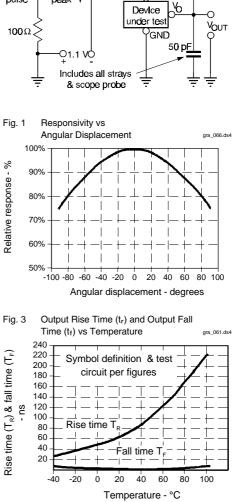
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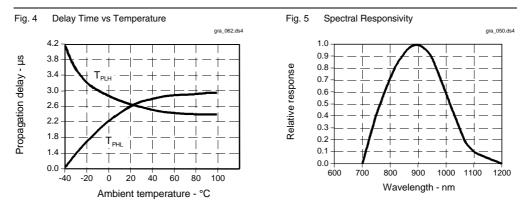
1kΩ

+5 V

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All Performance Curves Show Typical Values

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