

### ● Description

The H11Lx series has a high-speed integrated circuit detector optically coupled to a gallium-arsenide infrared emitting diode. The output incorporates a Schmitt trigger, which provides hysteresis for noise immunity and pulse shaping. The detector circuit is optimized for simplicity of operation and utilizes an open-collector output for maximum application flexibility.

### ● Features

1. High Data Rate, 2 MHz Typical (NRZ)
2. Free from Latch-up and Oscillation Throughout Voltage and Temperature Ranges
3. Microprocessor Compatible Drive
4. Logic Compatible Output Sinks 16 mA at 0.4 V Maximum
5. Guaranteed On/Off Threshold Hysteresis
6. Wide Supply Voltage Capability, Compatible with All Popular Logic Systems
7. Safety and Regulatory Approvals:

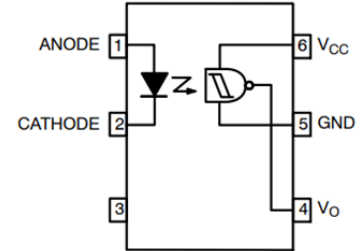
### ● Applications

- Logic-to-Logic Isolator
- Programmable Current Level Sensor
- Line Receiver – Eliminate Noise and Transient Problems
- AC to TTL Conversion – Square Wave Shaping
- Digital Programming of Power Supplies
- Interfaces Computers with Peripherals

### ● Truth Table

Input	Output
H	L
L	H

### ● Schematic

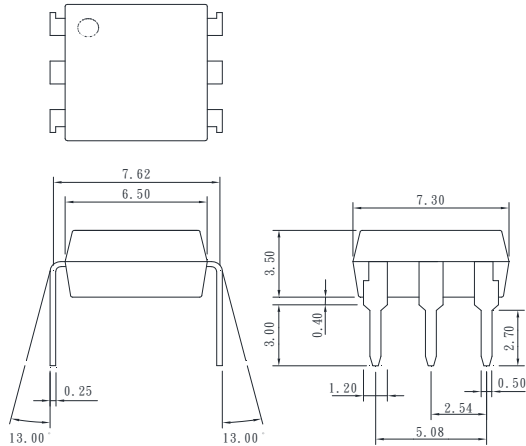


- |            |        |
|------------|--------|
| 1. Anode   | 4. Vo  |
| 2. Cathode | 5. GND |
| 3. N.C.    | 6. Vcc |

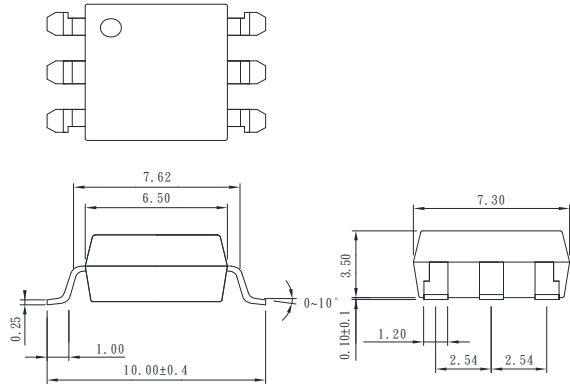
● **Outside Dimension**

Unit : mm

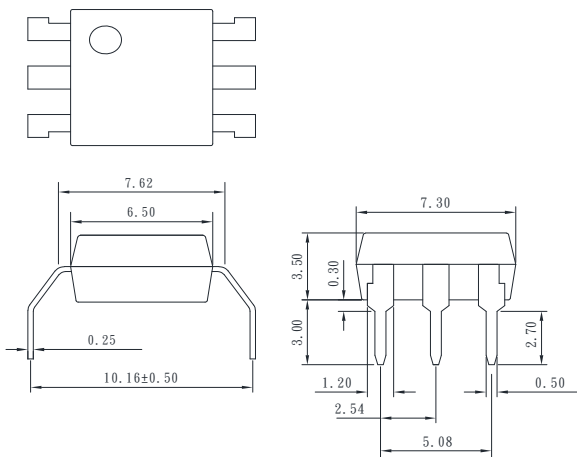
1. Dual-in-line type.



2. Surface mount type.

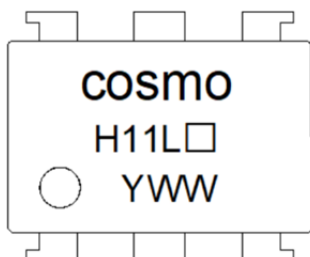


3. Long creepage distance type



TOLERANCE : ±0.2mm

● **Device Marking**



**Notes:**

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H11L□ H11L1, H11L2, H11L3

YWW Y: Year code / WW: Week code

### ● Absolute Maximum Ratings

(Ta = 25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current <sup>1</sup>	I <sub>F</sub>	50	mA
	Peak forward current	I <sub>FM</sub>	100	mA
	Reverse voltage	V <sub>R</sub>	6	V
	Power dissipation	P <sub>D</sub>	60	mW
Output	Supply voltage	V <sub>CC</sub>	3 to 16	V
	Output voltage	V <sub>O</sub>	0 to 16	V
	Output Current	I <sub>OL</sub>	50	mA
	Detector Power Dissipation	P <sub>D</sub>	150	mW
Isolation voltage 1 minute <sup>2</sup>		V <sub>ISO</sub>	5000	V <sub>RMS</sub>
Operating temperature		T <sub>opr</sub>	-40 to +110	°C
Storage temperature		T <sub>stg</sub>	-55 to +125	°C
Soldering temperature 10 seconds		T <sub>sol</sub>	260	°C
Total Device Power Dissipation		P <sub>D</sub>	250	mW

Note

1 Ta=25°C

2 This device is considered as a two-terminal device: Pins 1 and 3 are shorted together, and pins 4, 5 and 6 are shorted together

### ● Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply voltage	V <sub>CC</sub>	3	15	V

### ● Electro-optical Characteristics

Ta = 25°C unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Input Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	-	1.2	1.5	V	
		I <sub>F</sub> = 0.3 mA	0.75	1.0	-	V	
Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 3 V	-	-	10	uA	
Capacitance	C <sub>J</sub>	V = 0, f = 1.0 MHz	-	-	100	pF	
High Level Supply Current	I <sub>CC(off)</sub>	I <sub>F</sub> =0, V <sub>CC</sub> =5V	-	0.8	2.0	mA	
High Level Output Current	I <sub>OH</sub>	I <sub>F</sub> =0, V <sub>CC</sub> =V <sub>O</sub> =15V	-	-	100	uA	
Low level Supply Current	I <sub>CC(on)</sub>	I <sub>F</sub> =10mA, V <sub>CC</sub> =5V	-	0.8	2.0	mA	
Low Level Output Voltage	V <sub>OL</sub>	R <sub>L</sub> = 270Ω, V <sub>CC</sub> = 5 V, I <sub>F</sub> = I <sub>F(on)</sub> max	-	0.2	0.4	V	
Turn-On Threshold Current <sup>3</sup>	I <sub>F(on)</sub>	R <sub>L</sub> = 270Ω, V <sub>CC</sub> = 5 V	H11L1	-	-	1.6	mA
			H11L2	-	-	10	mA
			H11L3	-	-	5	mA
Turn-Off Threshold Current	I <sub>F(off)</sub>	R <sub>L</sub> = 270, V <sub>CC</sub> = 5 V	0.3	1.0	-	mA	
Hysteresis Ratio	I <sub>F(off)</sub> / I <sub>F(on)</sub>	R <sub>L</sub> = 270, V <sub>CC</sub> = 5 V	0.5	0.75	0.9	-	
Isolation Capacitance	C <sub>ISO</sub>	V <sub>I-O</sub> = 0 V, f = 1 MHz	-	0.4	0.6	pF	
Isolation Resistance	R <sub>ISO</sub>	V <sub>I-O</sub> = ±500 V <sub>DC</sub> , T <sub>A</sub> =25°C	10 <sup>11</sup>	-	-	Ω	
Turn On Time	T <sub>on</sub>	T <sub>A</sub> =25°C, V <sub>CC</sub> =5V, I <sub>F</sub> =I <sub>Fon</sub> , R <sub>L</sub> =270Ω	-	1	4	us	
Fall Time	t <sub>f</sub>		-	0.1	-	us	
Turn Off Time	T <sub>off</sub>		-	1	4	us	
Rise Time	t <sub>r</sub>		-	0.1	-	us	

#### Note

3. Maximum IF(ON) is the maximum current required to trigger the output. For example, a 1.6 mA maximum trigger current would require the LED to be driven at a current greater than 1.6 mA to guarantee the device turns on. A 10% guard band is recommended to account for degradation of the LED over its lifetime. The maximum allowable LED drive current is 30 mA.

### ● Test Circuit for Propagation Delay time

#### TYPICAL PERFORMANCE CURVES (continued)

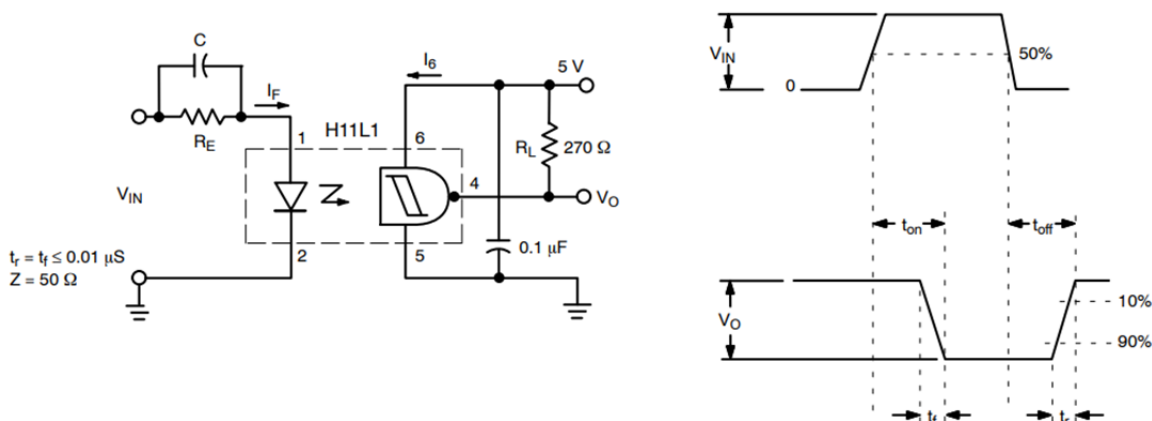
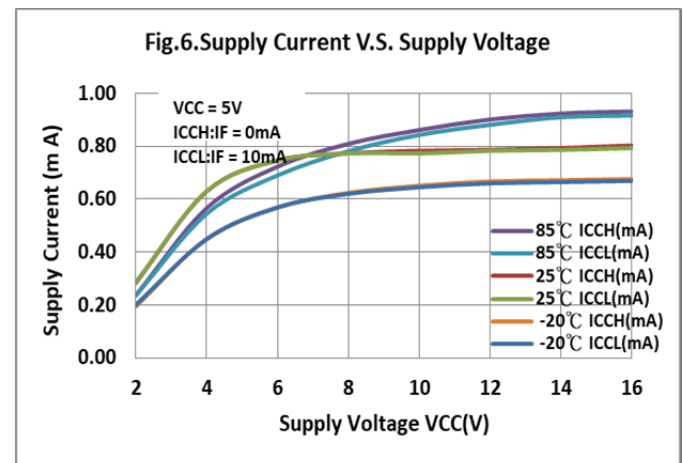
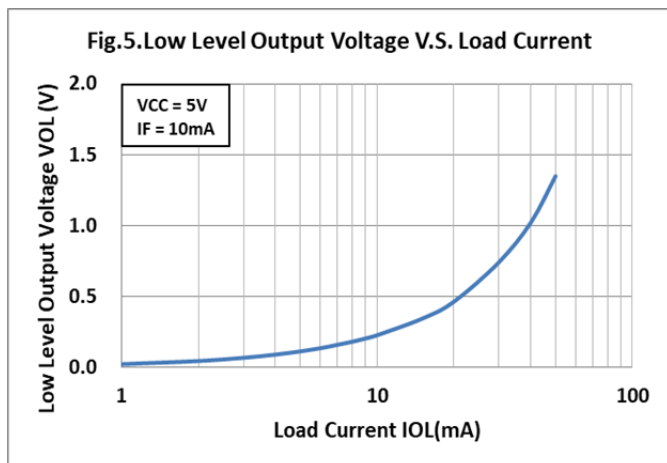
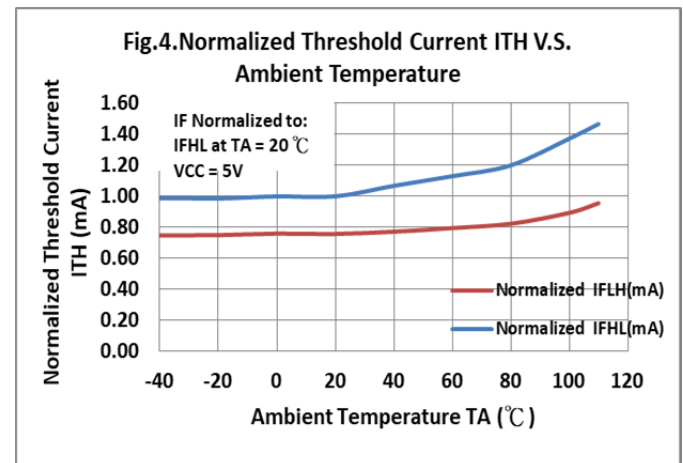
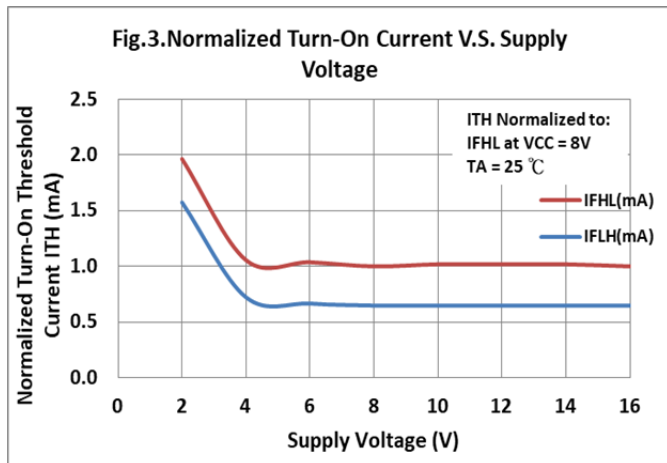
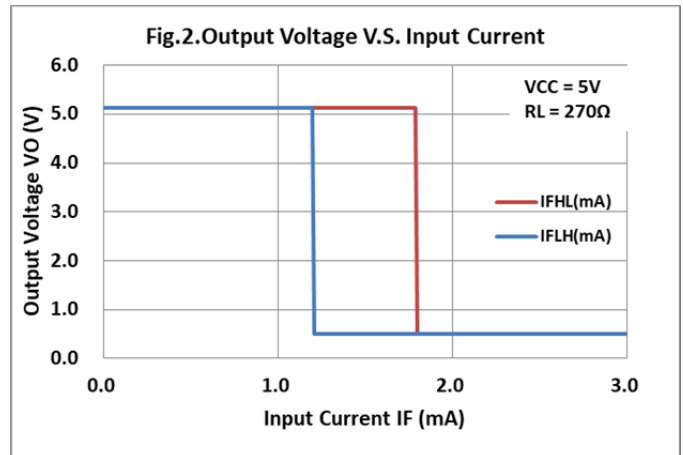
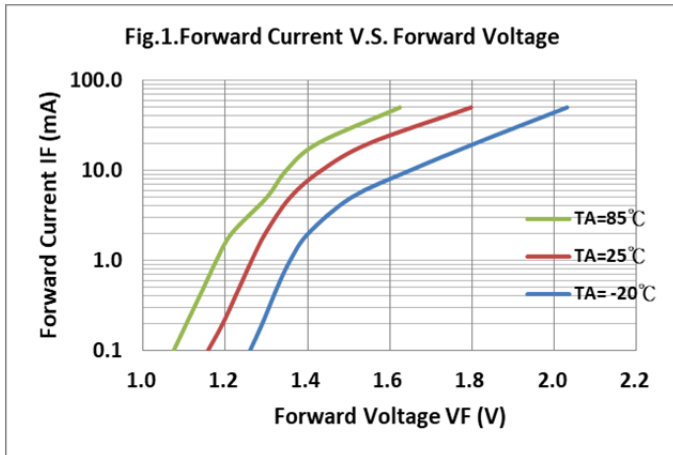


Figure 7. Switching Test Circuit and Waveforms

### ● Characteristics Curves

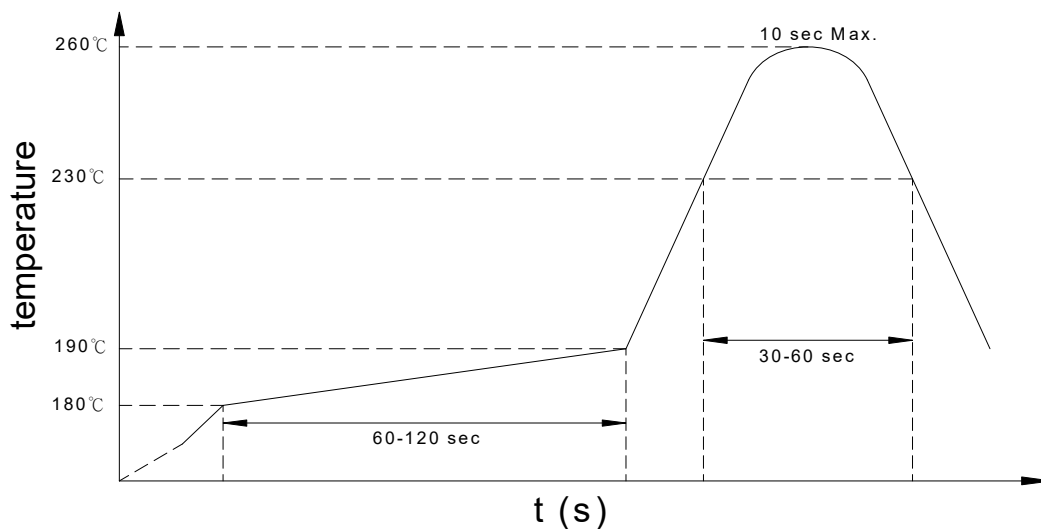


## ● Recommended Soldering Conditions

### (a) Infrared reflow soldering :

- Peak reflow soldering : 260°C or below (package surface temperature)
- Time of peak reflow temperature : 10 sec
- Time of temperature higher than 230°C : 30-60 sec
- Time to preheat temperature from 180~190°C : 60-120 sec
- Time(s) of reflow : Two
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

### Recommended Temperature Profile of Infrared Reflow



### (b) Wave soldering :

- Temperature : 260°C or below (molten solder temperature)
- Time : 10 seconds or less
- Preheating conditions : 120°C or below (package surface temperature)
- Time(s) of reflow : One
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

### (c) Cautions :

- Fluxes : Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- Avoid shorting between portion of frame and leads.

- **Numbering System**

## H11LX Y (Z)

**Notes:**

H11Lx = Part No. (H11L1 or H11L2 or H11L3)

X = Lead form option (blank · S · H )

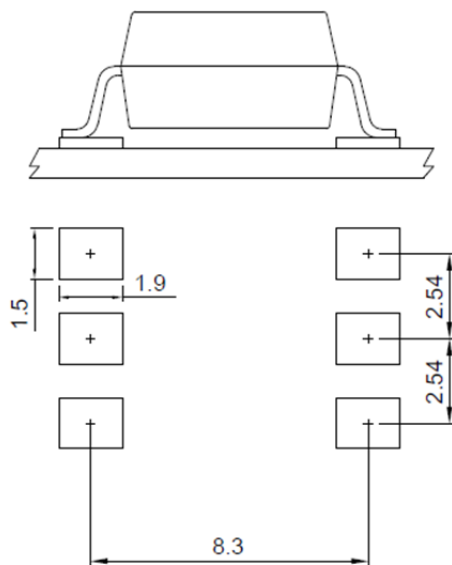
Y = Tape and reel option (TL · TR)

Option	Description	Packing quantity
S (TL)	surface mount type package + TL tape & reel option	1000 units per reel
S (TR)	surface mount type package + TR tape & reel option	1000 units per reel

- **Recommended Pad Layout for Surface Mount Lead Form**

Unit :mm

### 1.Surface mount type







- **Application Notice**

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