## DATASHEET

### 6 PIN DIP SCHMITT TRIGGER PHOTOCOUPLER H11LX Series



#### Features:

- High data rate, 1MHz typical (NRZ)
- Free from latch up and oscillation throughout voltage and temperature ranges.
- Microprocessor compatible drive
- Logic compatible output sinks 16mA at 0.4V maximum
- · Guaranteed on/off threshold hysteresis
- Wide supply voltage capability, compatible with all popular logic systems
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved

#### Description

The H11LX series of devices each consist of a GaAs infrared emitting diode optically coupled a high speed integrated circuit detector. The output detector incorporates a Schmitt trigger, which provides hysteresis for noise immunity and pulse shaping.

The devices are in a 6-pin DIP package and available in wide-lead spacing and SMD option.

#### **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

# Schematic

#### **Pin Configuration**

- 1. Anode
- 2. Cathode
- 3. No Connection
- 4. V<sub>O</sub>
- 5. GND
- $6. \ V_{CC}$

Truth Table			
Input Outpu			
Н	L		
L	Н		

#### Absolute Maximum Ratings (Ta=25℃)

	Parameter	Symbol	Rating	Unit
Input	Forward current	l <sub>F</sub>	60	mA
	Reverse voltage	V <sub>R</sub>	6	V
	Power dissipation	P <sub>D</sub>	120	mW
Output	V <sub>45</sub> Allowed Range	Vo	0 to 16	V
	V <sub>65</sub> Allowed Range	V <sub>CC</sub>	3 to 16	V
	Output Current	Ι <sub>ο</sub>	50	mA
	power dissipation	P <sub>D</sub>	150	mW
Total power dissipation		P <sub>tot</sub>	250	mW
Isolation v	oltage	V <sub>iso</sub>	5000	V rms
Operating temperature		T <sub>opr</sub>	-55~+100	°C
Storage te	mperature	T <sub>stg</sub>	-55~+150	°C
Soldering temperature *2		T <sub>sol</sub>	260	°C

#### Notes:

\*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

\*2 For 10 seconds

#### Electro-Optical Characteristics (Ta=25°C unless specified otherwise)

Input							
Parameter		Symbol	Min.	Тур.*	Max.	Unit	Condition
Forward Volt	age	V <sub>F</sub>	-	1.15	1.5	V	I <sub>F</sub> = 10mA
Reverse Cur	rent	I <sub>R</sub>	-	-	10	μA	$V_R = 5V$
Input capacit	ance	CJ	-	-	100	pF	V=0, f=1MHz
Output							
Par	ameter	Symbol	Min.	Тур.*	Max.	Unit	Condition
Operation Vo	Itage Range	V <sub>CC</sub>	3	-	15	V	
Supply Curre	ent	I <sub>CC(off)</sub>	-	1.6	5	mA	I <sub>F</sub> =0mA, Vcc=5V
Output Curre	nt, High	I <sub>OH</sub>	-	-	100	μA	I <sub>F</sub> =0mA, Vcc=Vo=15V
Isolation Res	istance	R <sub>ISO</sub>	10 <sup>11</sup>	-	-	Ω	V <sub>I-O</sub> =500VDC
Transfer Cl	naracteristics						
Pa	rameter	Symbol	Min	Тур.	Max.	Unit	Condition
Supply Curre	ent	I <sub>CC(on)</sub>	-	1.6	5	mA	I <sub>F</sub> =10mA, Vcc=5V
Output Volta	ge .low	V <sub>OL</sub>	-	-	0.4	V	Vcc=5V, $I_F=I_{Fon}(max.)$ , R <sub>L</sub> =270 $\Omega$
Turn on	H11L1	I <sub>Fon</sub>	-	-	1.6	mA	
Threshold Current <sup>1</sup>	H11L2		-	-	10		Vcc=5V, R <sub>L</sub> =270 $\Omega$
Current	H11L3		-	-	5		
Turn off Thre	shold Current	I <sub>Foff</sub>	-	1	-	mA	Vcc=5V, RL=270 $\Omega$
Hysteresis R	atio	I <sub>Foff</sub> /I <sub>Fon</sub>	0.5	-	0.9		Vcc=5V, R <sub>L</sub> =270 $\Omega$
Turn on Time	)	t <sub>on</sub>	-	-	4	$\mu{f S}$	
Fall Time		t <sub>r</sub>	-	0.1	-	$\mu{f S}$	Vcc=5V,
Turn off Time		t <sub>off</sub>	-	-	4	$\mu{f S}$	- I <sub>F</sub> =I <sub>Fon</sub> , R <sub>L</sub> =270 Ω
Rise Time		t <sub>r</sub>	-	0.1	-	$\mu{f S}$	_
Data Rate			-	1	-	MHz	

\* Typical values at  $T_a = 25 \degree C$ 

<sup>1</sup>. Max.  $I_{F(ON)}$  is the maximum current required to trigger the output. For examples, a 1.6mA maximum trigger current would require the LED to be driven at a current greater than 1.6mA to guarantee the device will turn on. A 10% guard band is recommended to account for degradation of the LED over its lifetime. The maximum allowable LED drive current is 60mA.

#### **Typical Electro-Optical Characteristics Curves**

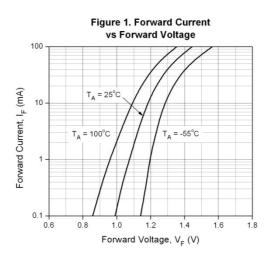
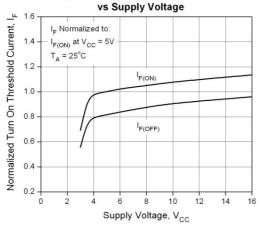
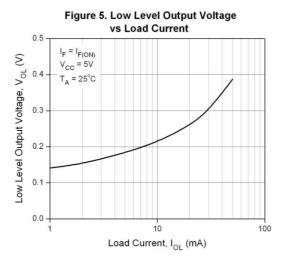


Figure 3. Turn On Threshold Current





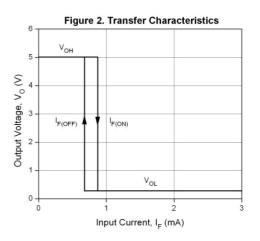
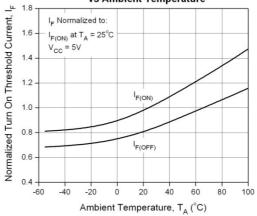
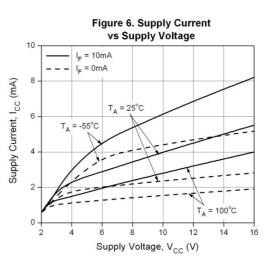
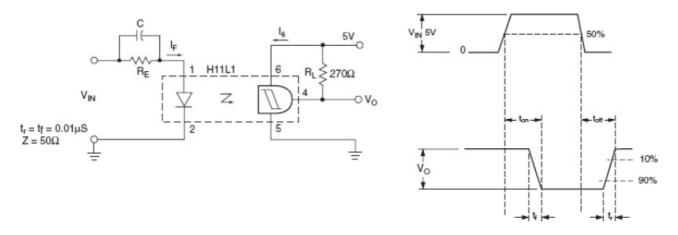


Figure 4. Turn On Threshold Current vs Ambient Temperature







#### Figure 7. Switching Time Test Circuit & Waveforms

#### **Order Information**

#### **Part Number**

# H11LXY(Z)-V

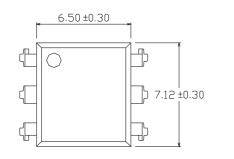
Note

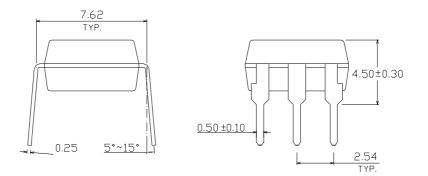
- X Y = Part No. for 1, 2 or 3
- = Lead form option (S, S1, M or none)
- Ż = Tape and reel option (TA, TB or none).
- = VDE (optional)

Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
М	Wide lead bend (0.4 inch spacing)	65 units per tube
S + TA	Surface mount lead form + TA tape & reel option	1000 units per reel
S + TB	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 + TA	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 + TB	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel

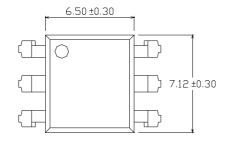
#### Package Dimension (Dimensions in mm)

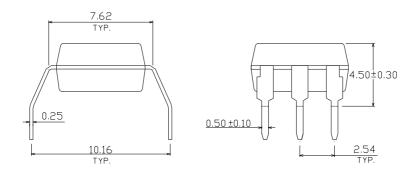
#### **Standard DIP Type**





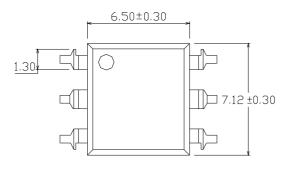
#### **Option M Type**

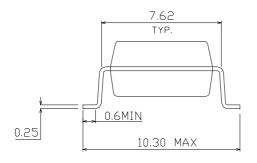


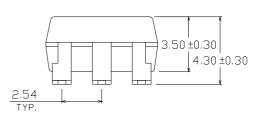




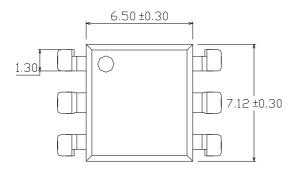
#### **Option S Type**

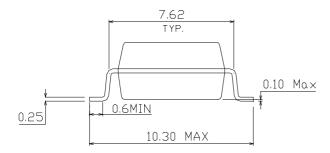


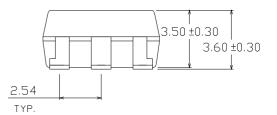




#### **Option S1 Type**

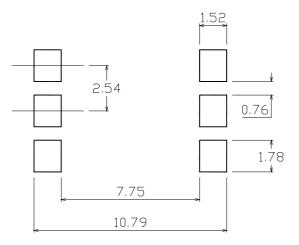




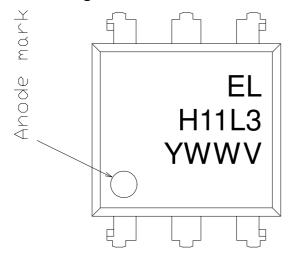




#### Recommended pad layout for surface mount leadform



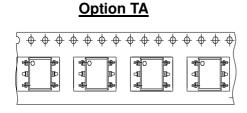
#### **Device Marking**



#### Notes

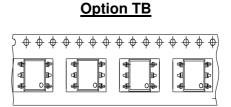
EL	denotes Everlight
H11L3	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

#### **Tape & Reel Packing Specifications**



Direction of feed from reel

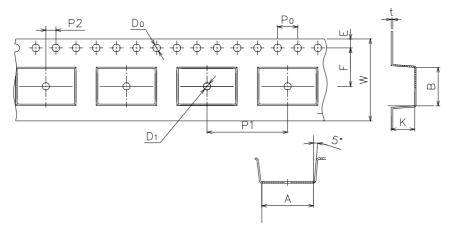
#### $\square$



#### Direction of feed from reel

#### 

#### **Tape dimensions**

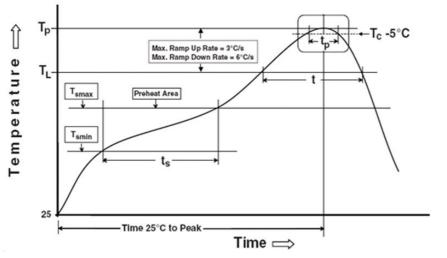


Dimension No.	Α	В	Do	D1	E	F
Dimension(mm)	10.4±0.1	7.5±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
Dimension No.	Ро	P1	P2	t	W	к
Dimension(mm)	4.0±0.15	12±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

#### **Precautions for Use**

#### 1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

#### Preheat

Temperature min (T <sub>smin</sub> )	150 ℃
Temperature max (T <sub>smax</sub> )	200 °C
Time $(T_{smin} \text{ to } T_{smax})$ $(t_s)$	60-120 seconds
Average ramp-up rate $(T_{smax}$ to $T_{p})$	3 °C/second max
Other	
Liquidus Temperature (T <sub>L</sub> )	217 ℃
Time above Liquidus Temperature (t $_{L}$ )	60-100 sec
Peak Temperature (T <sub>P</sub> )	260 <i>°</i> C
Time within 5 $^{\circ}\!\mathrm{C}$ of Actual Peak Temperature: T_P - 5 $^{\circ}\!\mathrm{C}$	30 s
Ramp- Down Rate from Peak Temperature	6℃ /second max.
Time 25 ℃ to peak temperature Reflow times	8 minutes max. 3 times

Reference: IPC/JEDEC J-STD-020D

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