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Revision: B

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

LITE-ON Technology Corp. / Optoelectronics

No.90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C. Tel: 886-2-2222-6181 Fax: 886-2-2221-1948 / 886-2-2221-0660 http://www.liteon.com/opto



H11Lx-L series 6-Pin Schmitt trigger Output Photocoupler with Ultra Low Power

1. Description

1.1 Features

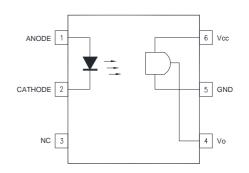
- Ultra-low I_{DD} current: 1.3 mA/channel maximum
- High data rate, 2MHz typical (NRZ)
- Free from latch up and oscilliation throughout voltage and temperature ranges.
- Microprocessor compatible drive
- Logic compatible output sinks 16mA at 0.4V maximum
- Guaranteed on/off threshold hysteresis
- Wide operating range
- Guaranteed performance over temperature -40°C ~ +100°C.
- 10 kV/µs minimum common mode transient immunity (CMTI) at V_{CM} = 1000 V.
- MSL Level 1
- Safety approval:

UL 1577 recognized with 5000 V_{RMS} for 1 minute VDE DIN EN60747-5-5, V_{IORM} = 630 Vpeak

1.2 Applications

- Logic to logic isolator
- Programmable current level sensor
- Line receiver—eliminate noise and transient problems
- A.C. to TTL conversion—square wave shaping
- Digital programming of power supplies
- Interfaces computers with peripherals

Functional Diagram



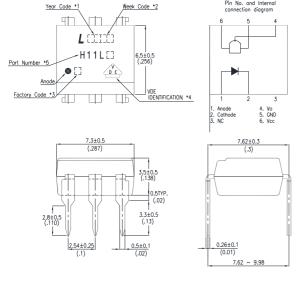
Truth Table

Input	Output
Н	L
L	Н

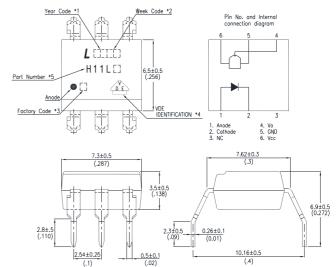


2. PACKAGE DIMENSIONS

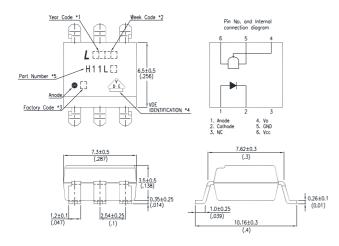
2.1 H11Lx-L



2.2 H11LxM-L



2.3 H11LxS-L



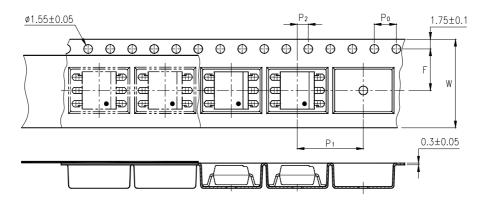
Notes:

- 1. Year date code.
- 2. 2-digit work week.
- 3. Factory identification mark (W: China-CZ, Y: Thailand)
- 4. VDE option.
- 5. Part number: H11L1 / H11L2 / H11L3
- * Dimensions are in Millimeters and (Inches).

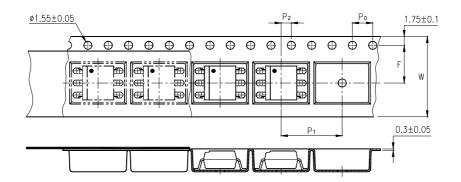


3. TAPING DIMENSIONS

3.1 H11LxS-TA-L



3.2 H11LxS-TA1-L



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (0.63)
Pitch of sprocket holes	P ₀	4±0.1 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
Distance of compartment	P ₂	2±0.1 (0.079)
Distance of compartment to compartment	P ₁	12±0.1 (0.472)

3.3 Quantities Per Reel

Package Type	TA / TA1
Quantities (pcs)	1000

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4. RATING AND CHARACTERISTICS

4.1 Absolute Maximum Ratings at Ta=25℃

	Parameter	Symbol	Rating	Unit
	Forward Current	l _F	20	mA
Input	Reverse Voltage	V_R	6	V
	Power Dissipation	Р	120	mW
	V ₄₅ Allowed Range	Vo	0 ~ 16	V
Output	V ₆₅ Allowed Range	V _{CC}	3 ~ 16	V
Output	I ₄ Output Current	I _O	50	mA
	Power Dissipation	Р	150	mW
	Total Power Dissipation	P _{tot}	250	mW
1.	Isolation Voltage	V_{iso}	5000	V_{rms}
	Operating Temperature	T_{opr}	-40 ~ + 100	°C
	Storage Temperature	T_{stg}	-55 ~ +150	°C
2.	Soldering Temperature	T _{sol}	260	°C

1. AC For 1 Minute, R.H. = 40 ~ 60%

Isolation voltage shall be measured using the following method.

- (1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
 - (2) The isolation voltage tester with zero-cross circuit shall be used.
 - (3) The waveform of applied voltage shall be a sine wave.
- 2. For 10 Seconds

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4.2 ELECTRICAL OPTICAL CHARACTERISTICS

All Typical values at T_A = 25°C and V_{CC} = 3 to 16 V, unless otherwise specified

	Paramet	er	Symbol	Min.	Тур.	Max.	Unit	Test Condition	Figure	Note
	Input Forward Voltage		V _F	1.2	1.4	1.6	V	$I_F = 10 \text{mA}$	6	
lant	input Forward vo	Jilage	VF	0.75			V	$I_F = 0.3 \text{mA}$	O	
Input	Reverse Current		I _R			10	μΑ	$V_R = 5V$		
	Input Capacitano	е	C _{IN}			100	pF	$f = 1 \text{ MHz}, V_F = 0 \text{ V}$		
	Operating Voltag	je Range	Vcc	3		15	V		-	
	Supply Current		I _{CC(off)}		0.7	1.3	mA	$I_F = 0$, $V_{CC} = 5V$	5	
	Output Current, High Supply Current		I _{OH}			100	μΑ	$I_F = 0$, $V_{CC} = V_O = 15V$		
			I _{CC(on)}		0.7	1.3	mA	$I_F = 10 \text{mA}$, $V_{CC} = 5 \text{V}$	5	
	Output Voltage,	low	V _{OL}		0.2	0.4	V	$R_L = 270\Omega, V_{CC}=5V,$ $I_F=I_{FON}(max.)$	4	
Output	Turn-On	H11L1			1.0	1.6		2 , 00 -	1, 2, 3	1
	Threshold	H11L2	I _{F(ON)}			10				
	Current	H11L3				5				
	Turn-Off Threshold Current		I _{F(OFF)}	0.3			mA	$R_L = 270\Omega, V_{CC}=5V$		
	Hysteresis Ratio		I _{F(OFF)} / I _{F(oN)}	0.5		0.9		$R_L = 270\Omega, V_{CC}=5V$		

Note 1: Maximum I_{F(ON)} is the maximum current required to trigger the output, For example, a 1.6mA maximum trigger current would require the LED to be driven at a current greater than 1.6mA to guarantee the device turns on. A 10% gurad band is recommended to account for degradation of LED over its lifetime.

4.3 SWITCHING SPECIFICATION

Parameter	Symbol	Min.	Тур.	Max.	Unit	Test Condition	Figure	Note
Propagation Delay Time to Low Output Level	T_{PHL}	_	180	500	ns		_	_
Fall Time	t _f	_	3	_	ns	$R_L = 270\Omega, V_{CC}=5V,$ $I_F=I_{FON}(max.), T_A=25^{\circ}C$	_	_
Propagation Delay Time to High Output Level	T _{PLH}	_	120	500	ns		_	_
Rise Time	t _r	_	0.1	_	ns		_	_
Data Rate	_	_	2	_	MHz	_	_	_
Logic High Common Mode Transient Immunity	CM _H	10	_	_	kV/µs	$V_{CC} = 5V$, $V_{CM} = 1000V$, R_L = 270 Ω $I_F = 0$ mA, $T_A = 25$ °C	8	2
Logic Low Common Mode Transient Immunity	CM _L	10	_	_	kV/µs	$\begin{split} V_{CC} &= 5\text{V}, V_{CM} = 1000\text{V} \\ R_L &= 270\Omega, I_F = I_{FON}(\text{max.}), \\ T_A &= 25^{\circ}\text{C} \end{split}$	8	3

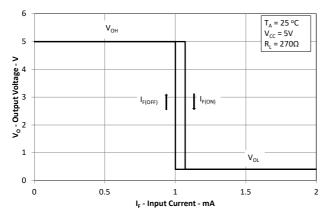
Note 2: Common mode transient immunity in a Logic High level is the maximum tolerable dV_{CM}/dt of the common mode pulse, V_{CM}, to assure that the output will remain in a Logic High state (i.e., $V_0 > 3.0 \text{ V}$).

Note 3: Common mode transient immunity in a Logic Low level is the maximum tolerable dV_{CM}/dt of the common mode pulse, V_{CM}, to assure that the output will remain in a Logic Low state (i.e., V_{O} < 1.0 V).

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5. TYPICAL PERFORMANCE CURVES



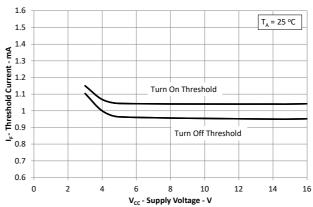
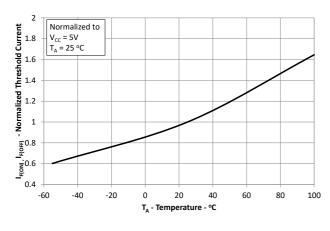


Figure 1. Transfer Chracteristic

Figure 2. Threshold Current vs. Supply Voltage



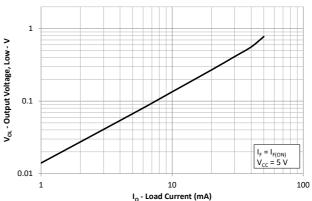
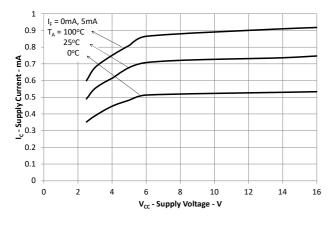


Figure 3. Threshold Current vs. Supply Temperature

Figure 4. Output Voltage, Low vs. Load Current



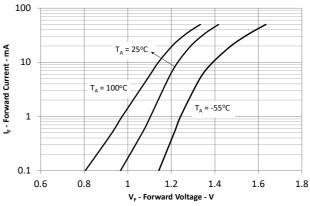


Figure 5. Supply Current vs. Supply Voltage

Figure 6. Forward Current vs. LED Forward Voltage

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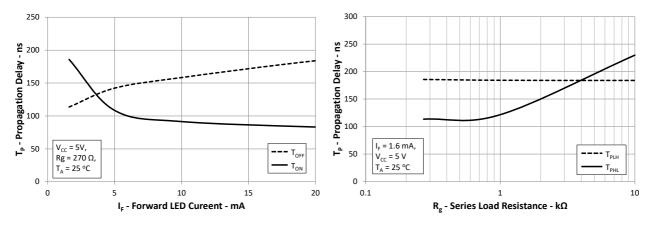


Figure 7. Propagation delay vs. Forward Current

Figure 8. Propagation delay vs. Load resistance

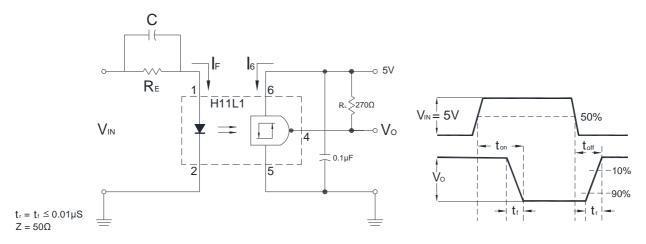


Figure 9. Switching Test Circuit and Waveform

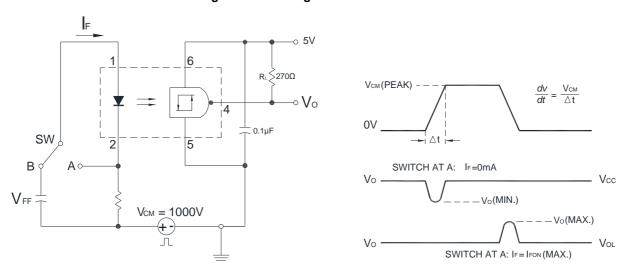


Figure 10 : CMR Test Circuit and Waveforms

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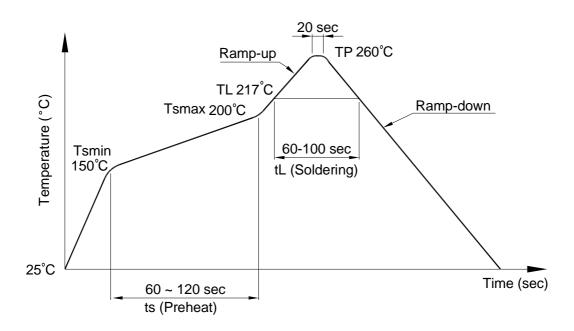


6. TEMPERATURE PROFILE OF SOLDERING

6.1 IR Reflow soldering (JEDEC-STD-020C compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

Profile item	Conditions
Preheat	
- Temperature Min (T _{Smin})	150°C
- Temperature Max (T _{Smax})	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (T _L)	217°C
- Time (t∟)	60 ~ 100 sec
Peak Temperature (T _P)	260°C
Ramp-up rate	3°C / sec max.
Ramp-down rate	3~6°C / sec



6.2 Wave soldering (JEDEC22A111 compliant)





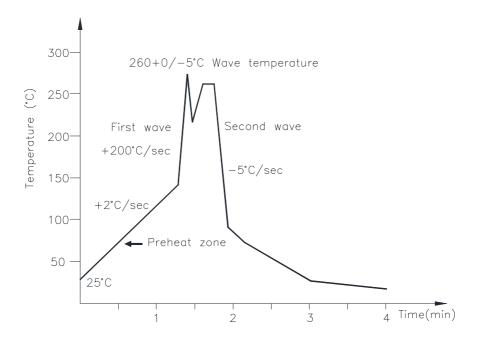
One time soldering is recommended within the condition of temperature.

Temperature: 260+0/-5°C

Time: 10 sec.

Preheat temperature:25 to 140°C

Preheat time: 30 to 80 sec.



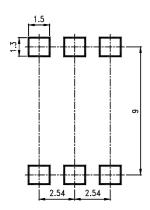
6.3 Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5°C

Time: 3 sec max.

7. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)



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8. NAMING RULE

Part Number Options
H11Lx-L
H11LxM-L
H11LxS-TA-L
H11LxS-TA1-L
H11Lx-V-L
H11LxM-V-L
H11LxSTA-V-L
H11LxSTA1-V-L

Definition of Suffix	Remark			
"H11Lx-L"	LiteOn model name			
TITTEX*E	Part number: H11L1 / H11L2 / H11L3			
"No Suffix"	Dual-in-Line package			
NO Sullix	clearance distance 7 mm typical			
"M"	Wide lead spacing package			
IVI	clearance distance 8 mm typical			
"S"	Surface mounting package			
3	clearance distance 8 mm typical			
"TA"	Pin 1 location at lower right of the tape			
"TA1"	Pin 1 location at upper left of the tape			
"V"	VDE approved option			

9. Notes

- LiteOn is continually improving the quality, reliability, function or design and LiteOn reserves the right to make changes without further notices.
- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
- When requiring a device for any "specific" application, please contact our sales in advice.
- If there are any questions about the contents of this publication, please contact us at your convenience.
- The contents described herein are subject to change without prior notice.
- Immerge unit's body in solder paste is not recommended.

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