



Photocoupler  
Product Data Sheet  
H11Lx-L series

Spec No. :DS70-2016-0020  
Effective Date: 04/20/2017  
Revision: A

**LITE-ON DCC**

**RELEASE**

**BNS-OD-FC001/A4**

## Photocoupler H11Lx-L series

### H11Lx-L series 6-Pin Schmitt trigger Output Photocoupler

#### 1. Description

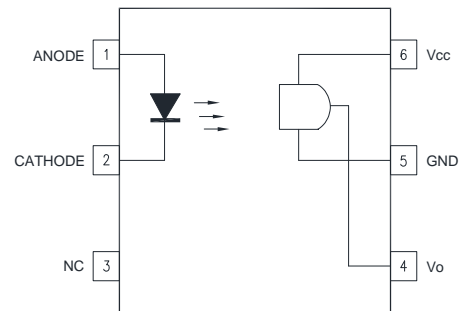
##### 1.1 Features

- High data rate, 2MHz 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 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,  $V_{IORM} = 630 V_{peak}$

##### 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



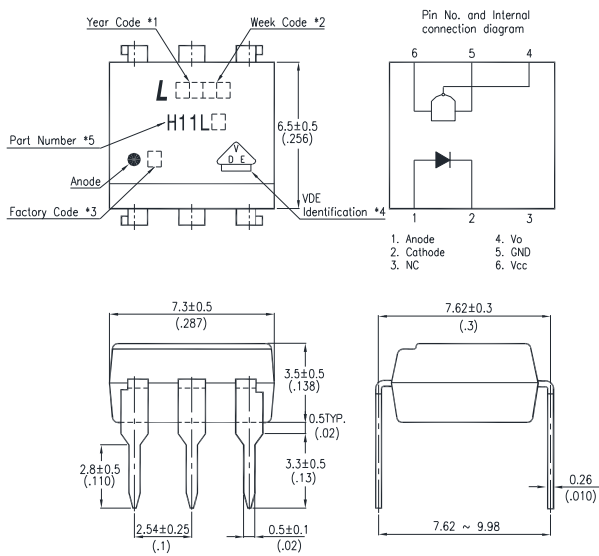
#### Truth Table

Input	Output
H	L
L	H

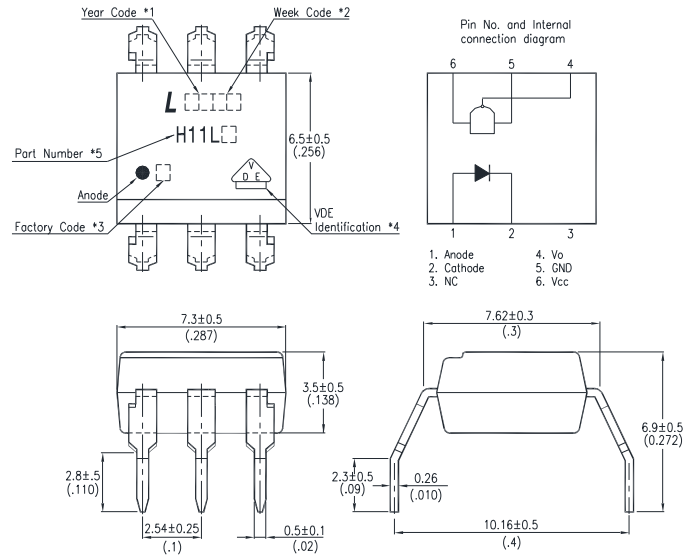
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### 2. PACKAGE DIMENSIONS

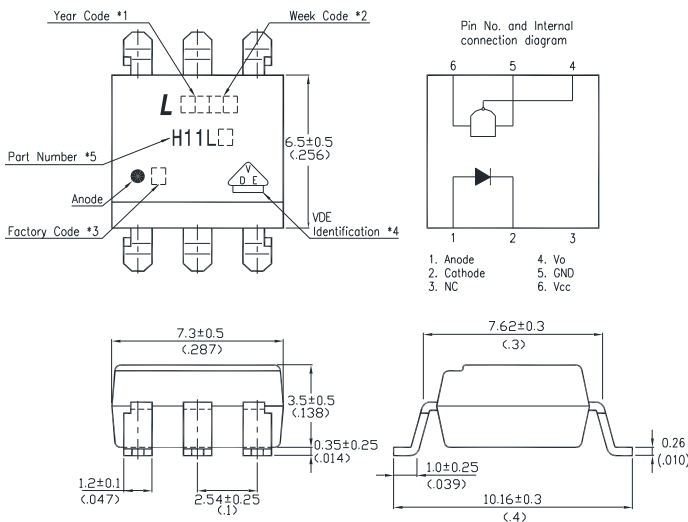
#### 2.1 H11Lx-L



#### 2.2 H11LxM-L



#### 2.3 H11LxS-L



#### Notes :

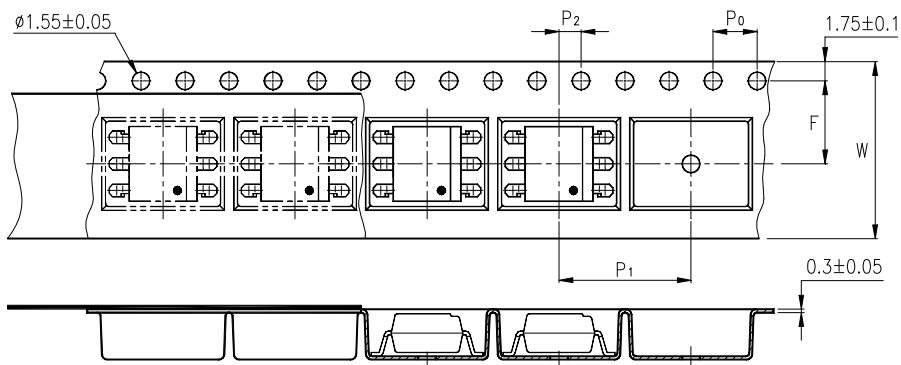
1. Year date code.
2. 2-digit work week.
3. Factory identification mark (W: China-CZ, Y: Thailand)
4. VDE option.
5. Part number: H11L1 / H11L2 / H11L3

\* Dimensions are in Millimeters and (Inches).

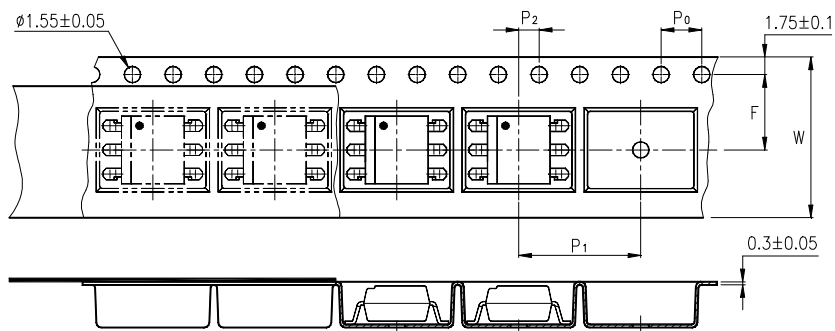
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### 3. TAPING DIMENSIONS

#### 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 <sub>0</sub>	4±0.1 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
	P <sub>2</sub>	2±0.1 (0.079)
Distance of compartment to compartment	P <sub>1</sub>	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°C

	Parameter	Symbol	Rating	Unit
Input	Forward Current	$I_F$	20	mA
	Reverse Voltage	$V_R$	6	V
	Power Dissipation	P	120	mW
Output	V <sub>45</sub> Allowed Range	$V_O$	0 ~ 16	V
	V <sub>65</sub> Allowed Range	$V_{CC}$	3 ~ 16	V
	I <sub>4</sub> Output Current	$I_O$	50	mA
	Power Dissipation	P	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  $T_A = 25^\circ\text{C}$  and  $V_{CC} = 3$  to  $16\text{ V}$ , unless otherwise specified

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Condition	Figure	Note	
Input	Input Forward Voltage	$V_F$	1.2	1.4	1.6	V	$I_F = 10\text{mA}$	6		
			0.75				$I_F = 0.3\text{mA}$			
	Reverse Current	$I_R$			10	$\mu\text{A}$	$V_R = 3\text{V}$			
	Input Capacitance	$C_{IN}$			100	pF	$f = 1\text{ MHz}, V_F = 0\text{ V}$			
Output	Operating Voltage Range		$V_{CC}$	3		15	V		5	
	Supply Current		$I_{CC(\text{off})}$		0.7	1.5	mA	$I_F = 0, V_{CC} = 5\text{V}$		
	Output Current, High		$I_{OH}$			100	$\mu\text{A}$	$I_F = 0, V_{CC} = V_O = 15\text{V}$		
	Supply Current		$I_{CC(\text{on})}$		0.7	1.5	mA	$I_F = 10\text{mA}, V_{CC} = 5\text{V}$	5	
	Output Voltage, low		$V_{OL}$		0.2	0.4	V	$R_L = 270\Omega, V_{CC}=5\text{V}, I_F=I_{FON(\text{max.})}$	4	
	Turn-On Threshold Current	H11L1	$I_{F(\text{ON})}$		0.65	1.6	mA	$R_L = 270\Omega, V_{CC}=5\text{V}$	1, 2, 3	1
		H11L2				10				
H11L3					5					
Turn-Off Threshold Current		$I_{F(\text{OFF})}$	0.3	0.5		mA	$R_L = 270\Omega, V_{CC}=5\text{V}$			
Hysteresis Ratio		$I_{F(\text{OFF})} / I_{F(\text{ON})}$	0.5		0.9		$R_L = 270\Omega, V_{CC}=5\text{V}$			

Note 1: Maximum  $I_{F(\text{ON})}$  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% guard band is recommended to account for degradation of LED over its lifetime.

### 4.3 SWITCHING SPECIFICATION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition	Figure	Note
Turn-On time	$t_{ON}$	—	0.5	4	$\mu\text{s}$	$R_L = 270\Omega, V_{CC}=5\text{V}, I_F=I_{FON(\text{max.})}, T_A=25^\circ\text{C}$	—	—
Fall Time	$t_f$	—	0.1	—	$\mu\text{s}$		—	—
Turn-Off Time	$t_{OFF}$	—	0.5	4	$\mu\text{s}$		—	—
Rise Time	$t_r$	—	0.1	—	$\mu\text{s}$		—	—
Data Rate	—	—	2	—	MHz	—	—	—
Logic High Common Mode Transient Immunity	$ CM_H $	10	—	—	kV/ $\mu\text{s}$	$V_{CC} = 5\text{V}, V_{CM} = 1000\text{V}, R_L = 270\Omega, I_F = 0\text{mA}, T_A = 25^\circ\text{C}$	8	2
Logic Low Common Mode Transient Immunity	$ CM_L $	10	—	—	kV/ $\mu\text{s}$	$V_{CC} = 5\text{V}, V_{CM} = 1000\text{V}, R_L = 270\Omega, I_F=I_{FON(\text{max.})}, T_A = 25^\circ\text{C}$	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.,  $V_O > 3.0\text{ V}$ ).

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.,  $V_O < 1.0\text{ V}$ ).

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## 5. TYPICAL PERFORMANCE CURVES

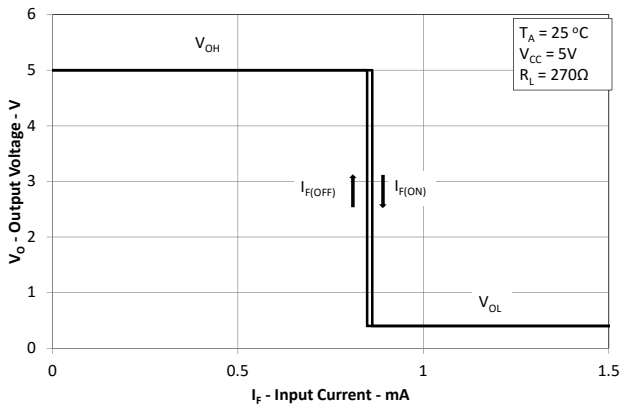


Figure 1. Transfer Characteristic

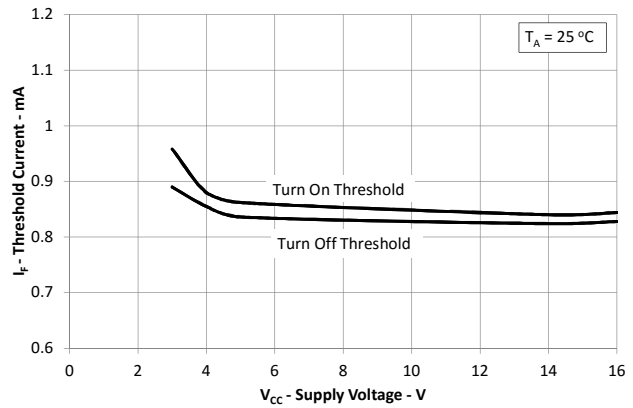


Figure 2. Threshold Current vs. Supply Voltage

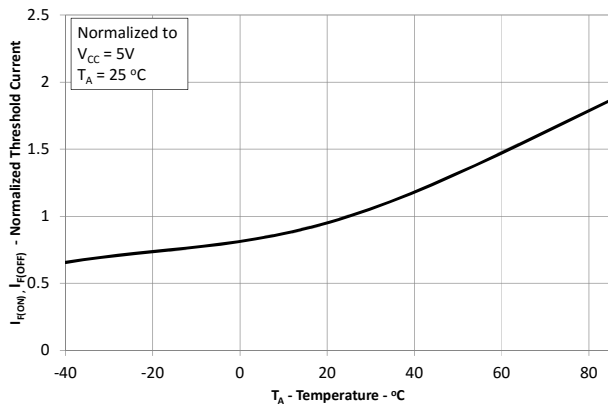


Figure 3. Threshold Current vs. Supply Temperature

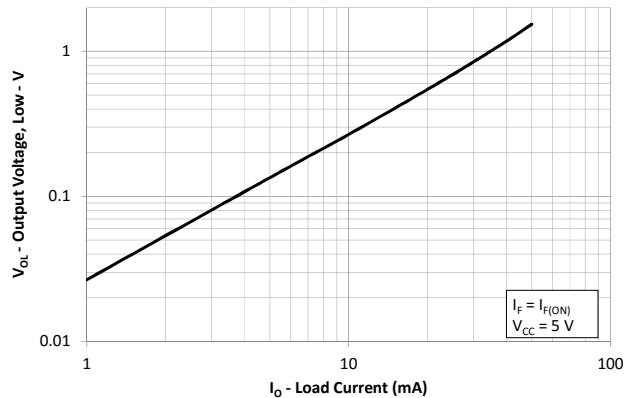


Figure 4. Output Voltage, Low vs. Load Current

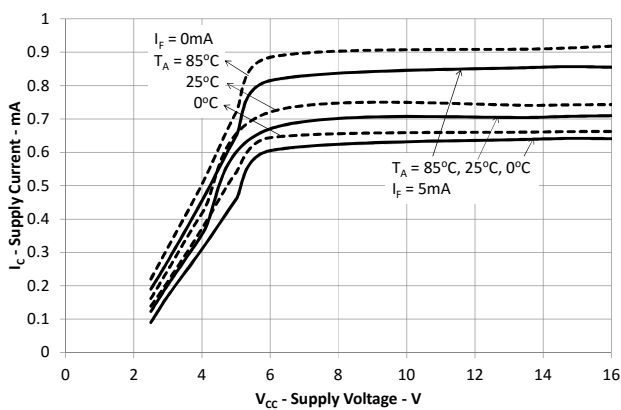


Figure 5. Supply Current vs. Supply Voltage

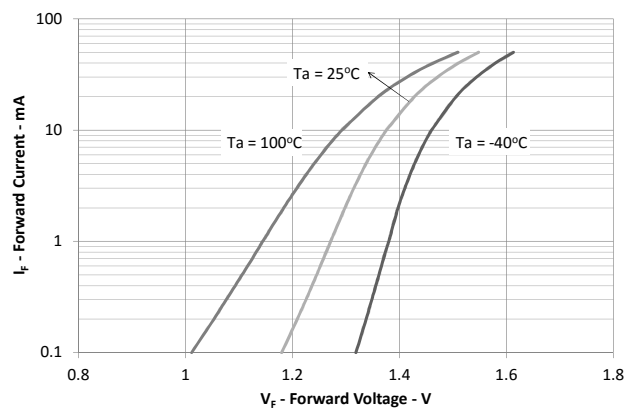


Figure 6. Forward Current vs. LED Forward Voltage

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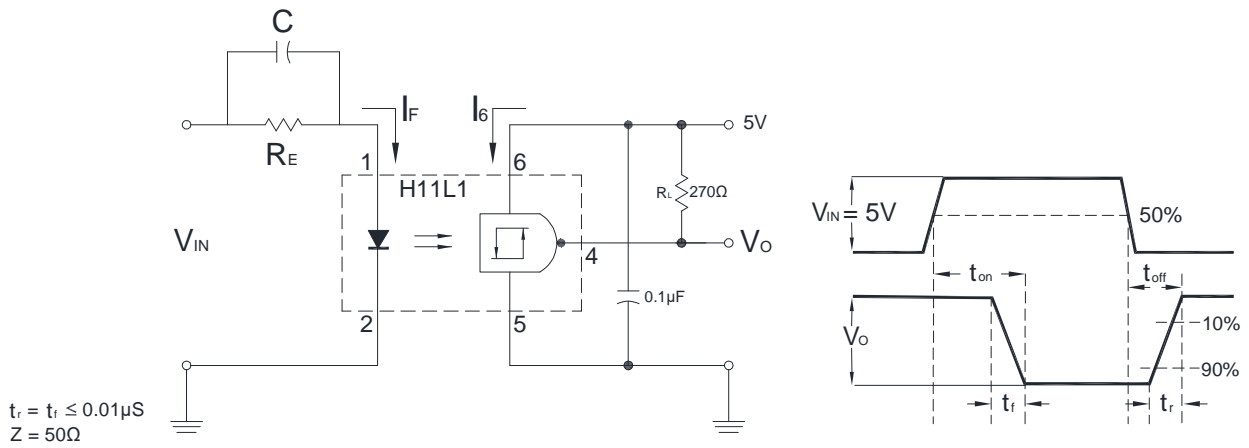


Figure 7. Switching Test Circuit and Waveform

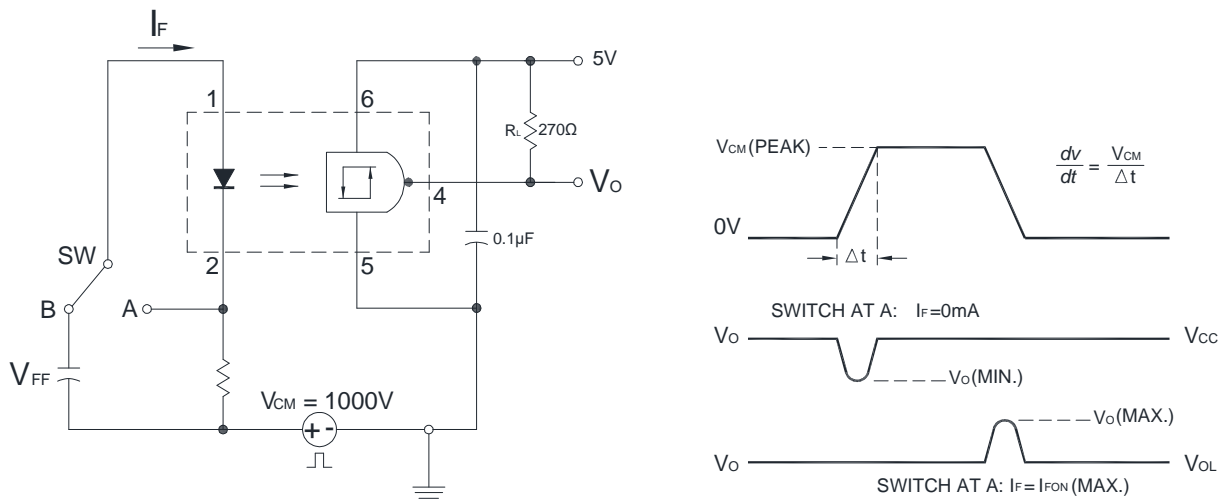


Figure 8 : CMR Test Circuit and Waveforms



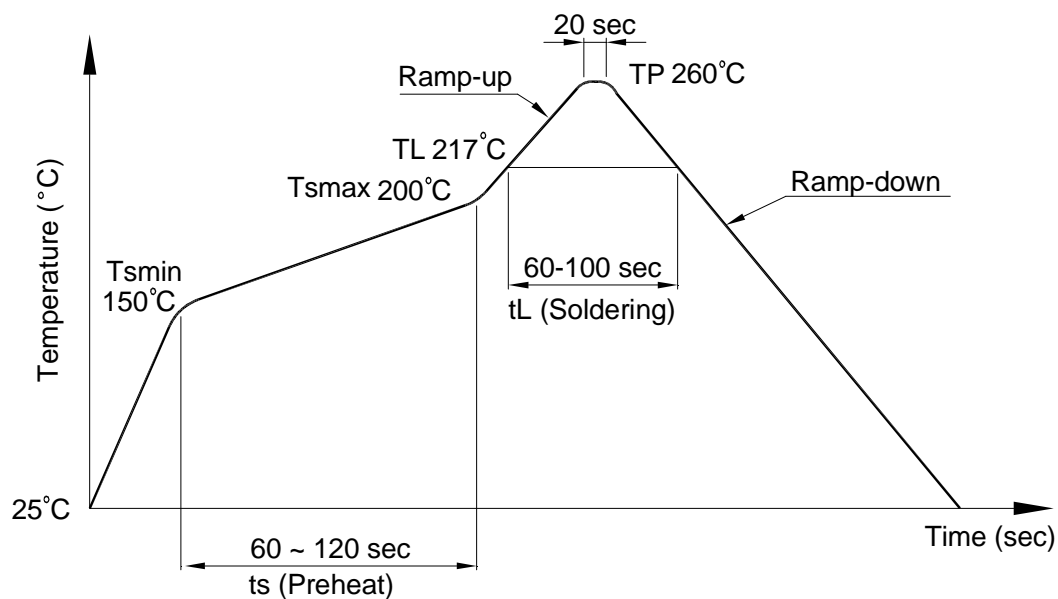
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### 6. TEMPERATURE PROFILE OF SOLDERING

#### 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 ( $t_L$ )	60 ~ 100 sec
Peak Temperature ( $T_P$ )	260°C
Ramp-up rate	3°C / sec max.
Ramp-down rate	3~6°C / sec



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### 6.2 Wave soldering (JEDEC22A111 compliant)

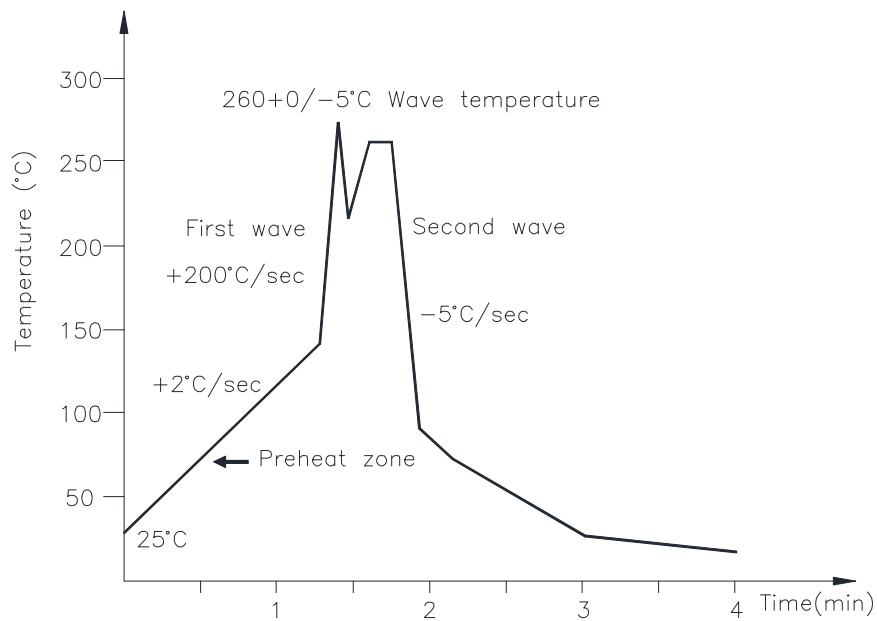
One time soldering is recommended within the condition of temperature.

Temperature:  $260 \pm 0 / -5^\circ\text{C}$

Time: 10 sec.

Preheat temperature: 25 to  $140^\circ\text{C}$

Preheat time: 30 to 80 sec.



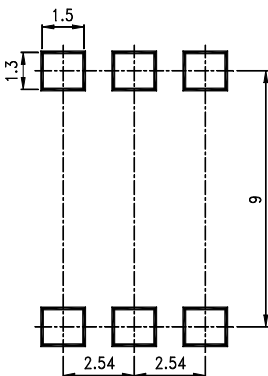
### 6.3 Hand soldering by soldering iron

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

Temperature:  $380 \pm 0 / -5^\circ\text{C}$

Time: 3 sec max.

## 7. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)



## Photocoupler H11Lx-L series

### 8. NAMING RULE

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

Definition of Suffix	Remark
"H11Lx-L"	LiteOn model name Part number: H11L1-L / H11L2-L / H11L3-L
"No Suffix"	Dual-in-Line package, clearance distance 7 mm typical
"M"	Wide lead spacing package, clearance distance 9 mm typical
"S"	Surface mounting package, clearance distance 7 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

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- 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.
- Immerse unit's body in solder paste is not recommended.