

**DIP6, DC Input, Schmitt Trigger Photo Coupler**

**Description**

The H11LX series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a Schmitt Trigger detector in a plastic DIP6 package with different lead forming options.

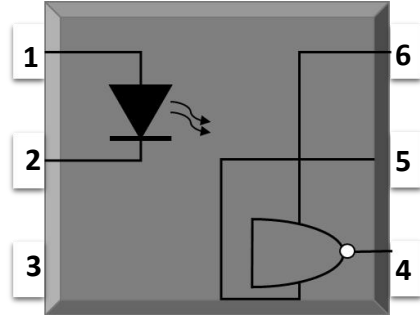
**Features**

- High isolation 5000 VRMS
- DC input with Schmitt trigger output
- Operating temperature range - 55 °C to 100 °C
- REACH & RoHS compliance
- MSL class 1
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC - GB4943.1, GB8898
  - cUL- CSA Component Acceptance Service Notice No. 5A

**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

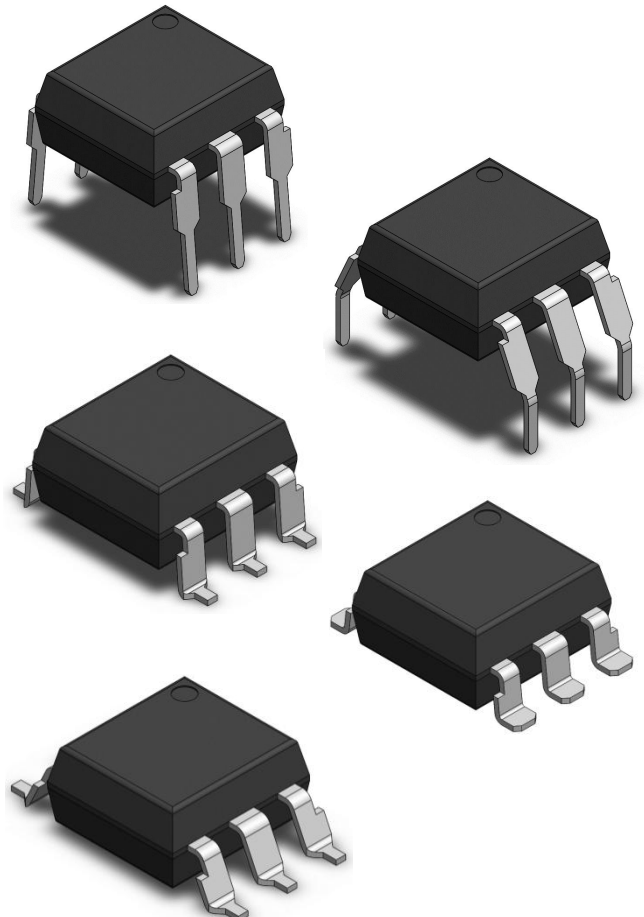
**SCHEMATIC**



**PIN DEFINITION**

- |                   |                |
|-------------------|----------------|
| <b>1. Anode</b>   | <b>6. VCC</b>  |
| <b>2. Cathode</b> | <b>5. GND</b>  |
| <b>3. NC</b>      | <b>4. VOUT</b> |

**PACKAGE OUTLINE**





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**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	VALUE	UNIT	Note
<b>INPUT</b>				
Forward Current	IF	60	mA	
Peak Transient Current	IF(trans)	1	A	1
Reverse Voltage	VR	6	V	
Input Power Dissipation	PI	120	mW	
<b>OUTPUT</b>				
Supply Voltage	VCC	3 to 16	V	
Output Voltage	VO	0 to 16	V	
Output Current	IO	50	mA	
Output Power Dissipation	PO	150	mW	
<b>COMMON</b>				
Total Power Dissipation	Ptot	250	mW	
Isolation Voltage	Viso	5000	Vrms	2
Operating Temperature	Topr	-55~100	°C	
Storage Temperature	Tstg	-55~150	°C	
Soldering Temperature	Tsol	260	°C	3

Note 1.  $\leq 1\mu\text{s}$  P.W,300pps

Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

Note 3. For 10 seconds



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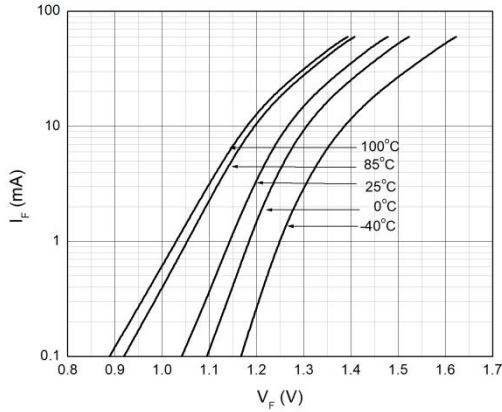
**ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
<b>INPUT</b>							
Forward Voltage	VF	-	1.24	1.5	V	IF=10mA	
Reverse Current	IR	-	-	10	µA	VR=5V	
Input Capacitance	Cin	-	60	-	pF	V=0, f=1MHz	
<b>OUTPUT</b>							
Operation Voltage Range	VCC	3	-	15	V		
Off State Supply Current	ICC(off)	-	1.6	5	mA	IF=0mA, VCC=5V	
On State Supply Current	ICC(on)	-	1.6	5	mA	IF=10mA, VCC=5V	
High Level Output Current	IOH	-	-	100	µA	IF=0mA, VCC=VO=15V	
<b>TRANSFER CHARACTERISTICS (Ta=-40 to 85°C)</b>							
Low Level Output Voltage	VOL	-	0.35	0.6	V	VCC=5.5V, IF=5mA, RL=270Ω	
Turn On Threshold Current	H11L1	IFon	-	-	1.6	mA	VCC=5V, RL=270Ω
	H11L2		-	-	10		
	H11L3		-	-	5		
Turn Off Threshold Current	IFoff	-	1	-	mA	VCC=5V, RL=270Ω	
Turn On Time	ton	-	-	4	µs	VCC=5V, IF=IFon, RL=270Ω	
Fall Time	tr	-	0.1	-	µs		
Turn Off Time	toff	-	-	4	µs		
Rise Time	tr	-	0.1	-	µs		
Data Rate		-	1	-	MHz		
Common Mode Transient Immunity at Logic High	CMH	10	-	-	KV/µs	VCM=1KV VCC=5V RL=270 Ω IF=0mA	
Common Mode Transient Immunity at Logic Low	CML	10	-	-	KV/µs	VCM=1KV VCC=5V RL=270 Ω IF=IFon	
Isolation Resistance	Riso	10 <sup>12</sup>	10 <sup>14</sup>	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	CIO	-	0.3	1	pF	V=0, f=1MHz	

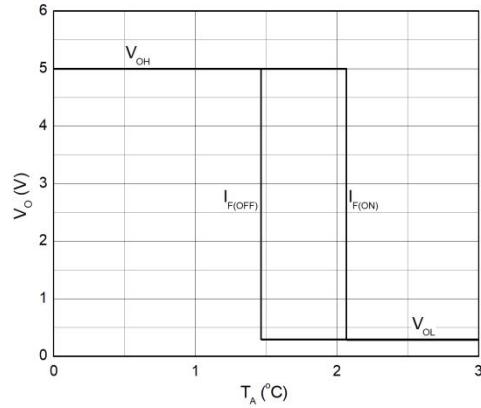
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**CHARACTERISTIC CURVES**

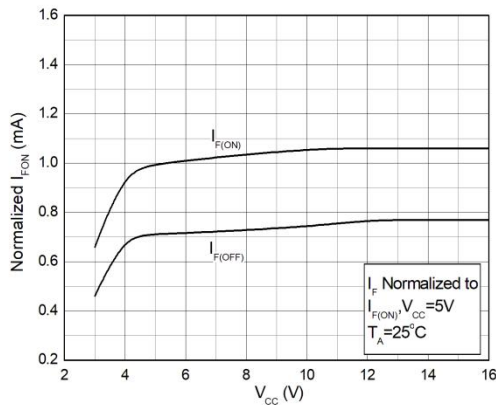
**Fig.1 Forward Current vs. Forward Voltage**



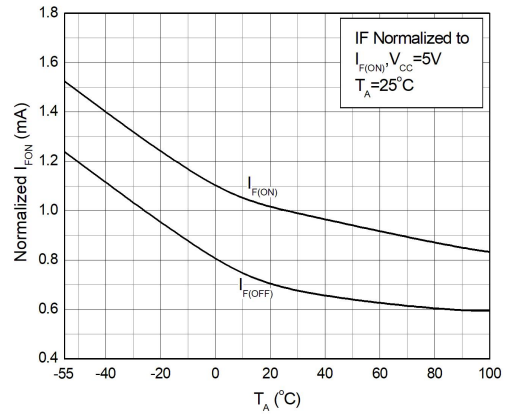
**Fig.2 Output Voltage vs. Forward Current**



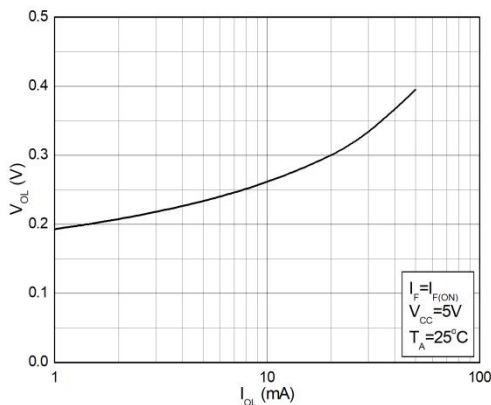
**Fig.3 Normalized Turn on Threshold Current vs. Supply Voltage**



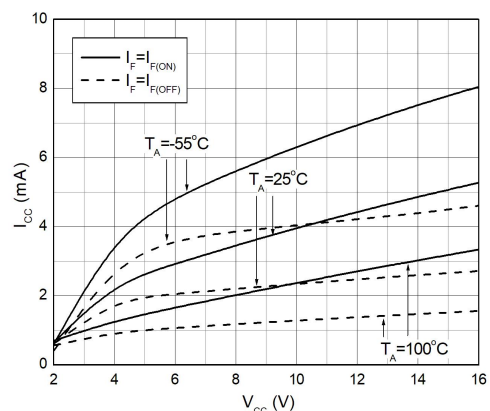
**Fig.4 Normalized Turn on Threshold Current vs. Ambient Temperature**



**Fig.5 Low Level Output Voltage vs. Load Current**



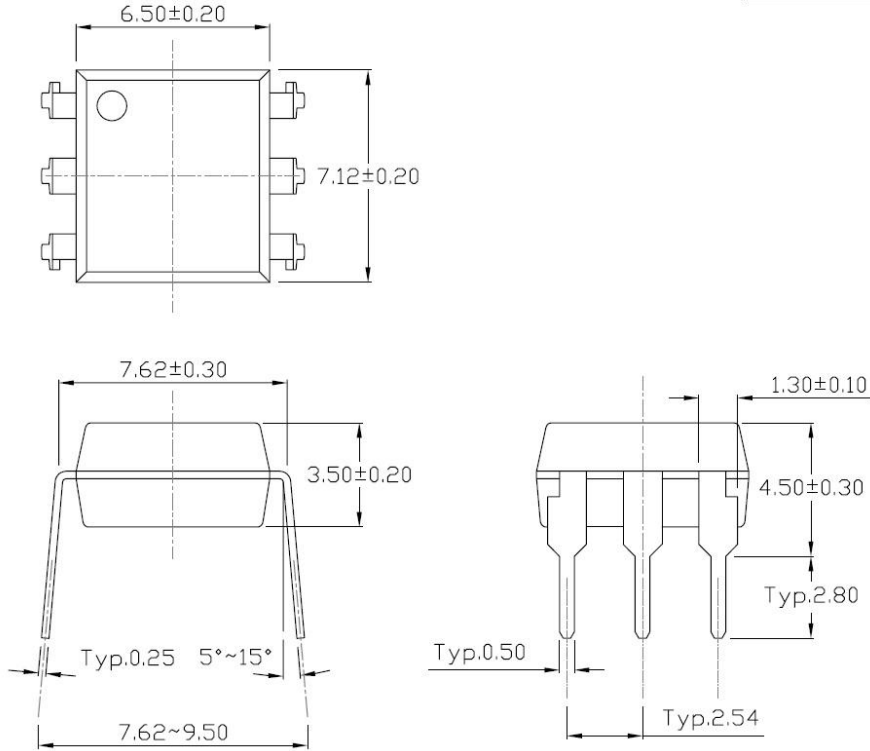
**Fig.6 Supply Current vs. Supply Voltage**



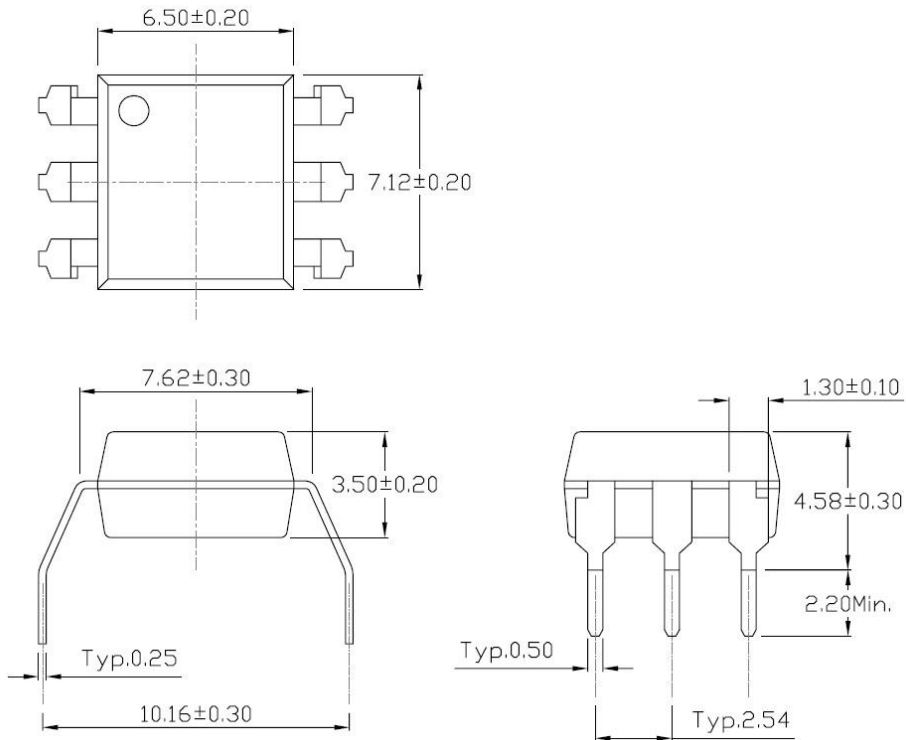
**DIP6, DC Input, Schmitt Trigger Photo Coupler**

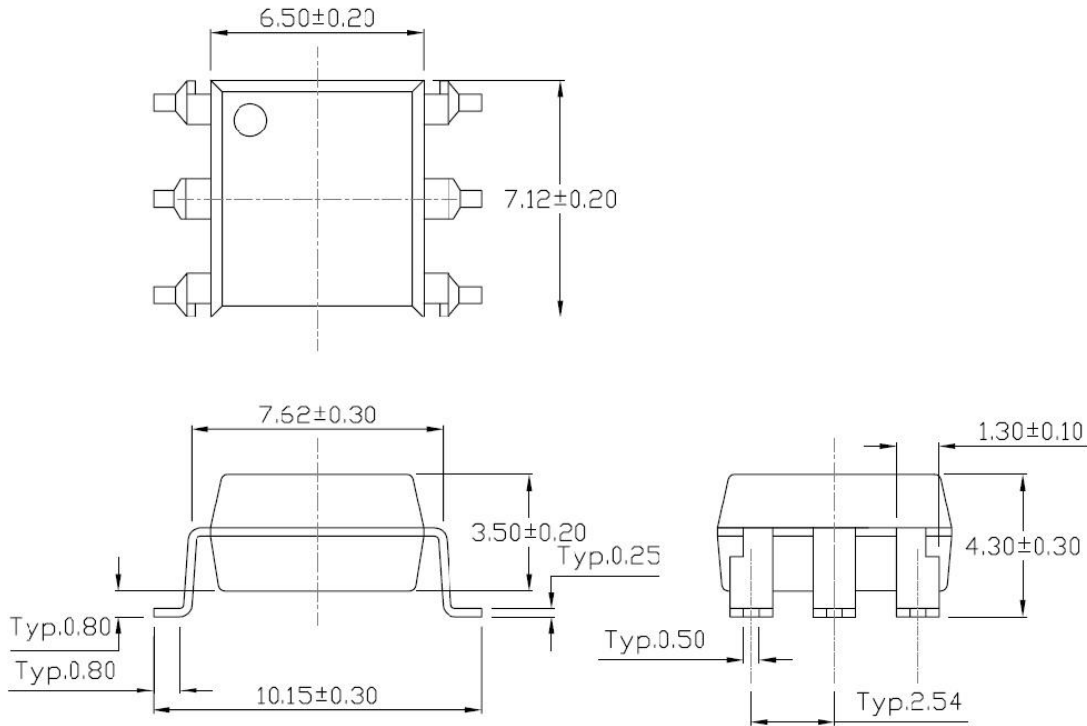
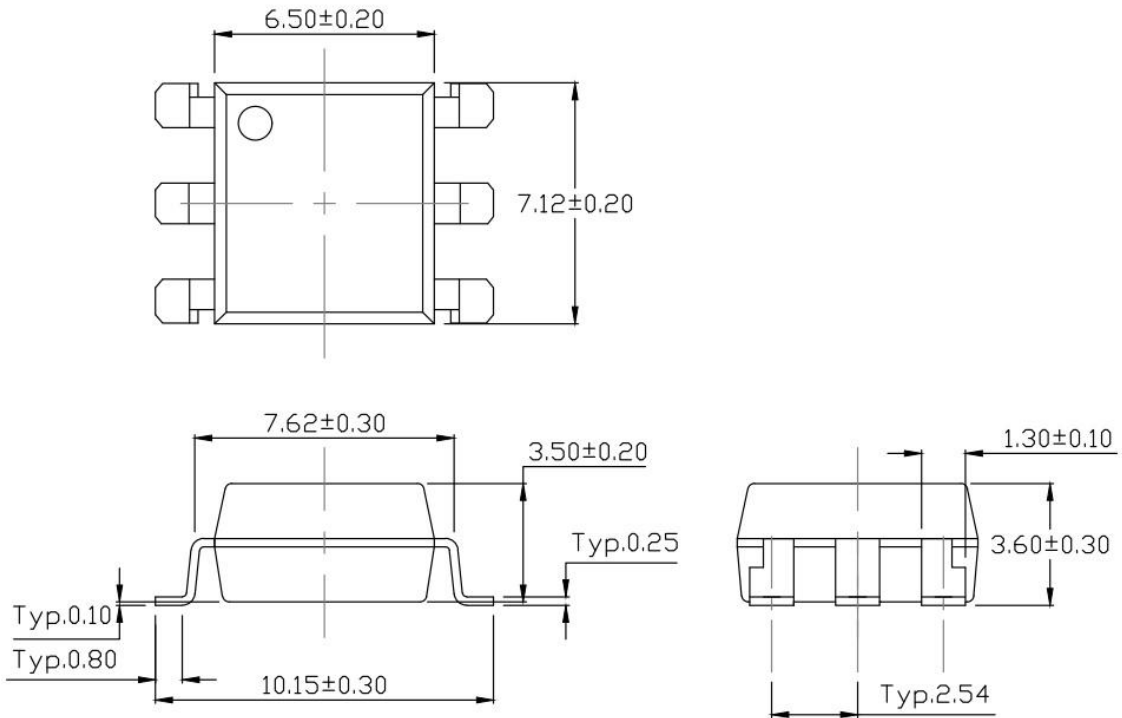
**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**

**Standard DIP – Through Hole (DIP Type)**



**Gullwing (400mil) Lead Forming – Through Hole (M Type)**

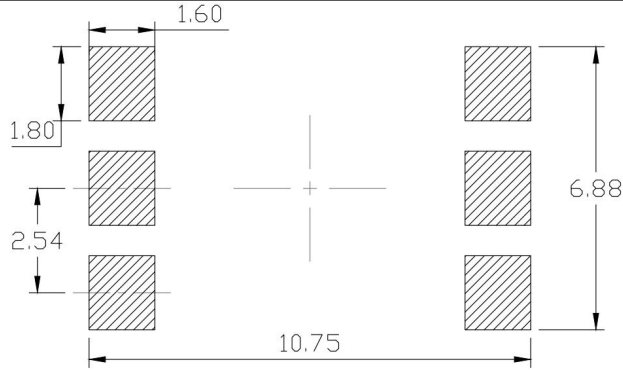


**DIP6, DC Input, Schmitt Trigger Photo Coupler**
**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**
**Surface Mount Lead Forming (S Type)**

**Surface Mount (Low Profile) Lead Forming (SL Type)**


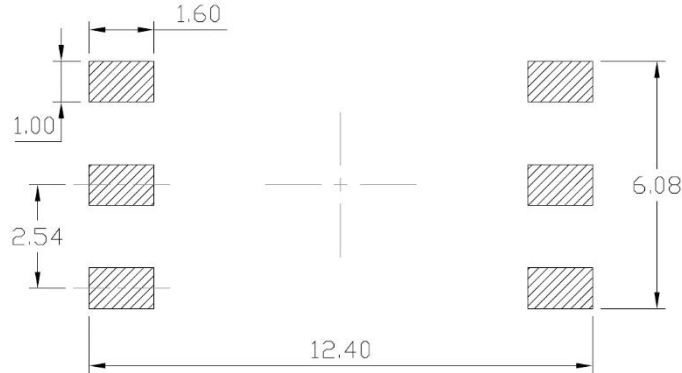
**DIP6, DC Input, Schmitt Trigger Photo Coupler**

**RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)**

**Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming**



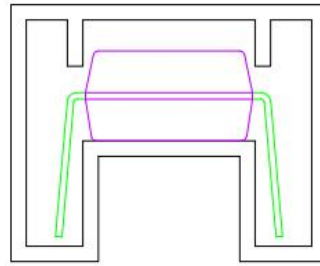
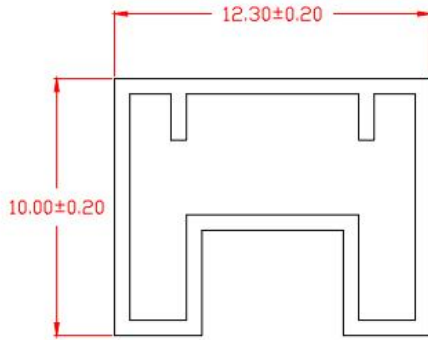
**Surface Mount (Gullwing) Lead Forming**



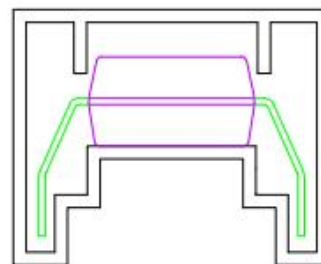
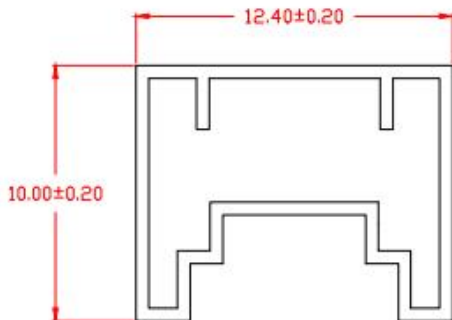
**DIP6, DC Input, Schmitt Trigger Photo Coupler**

**TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Standard DIP**



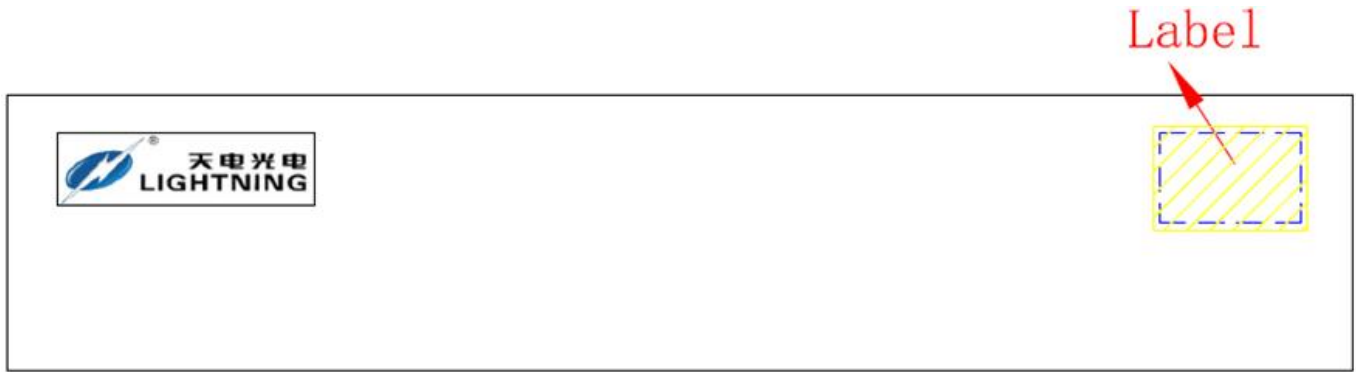
**Option M**





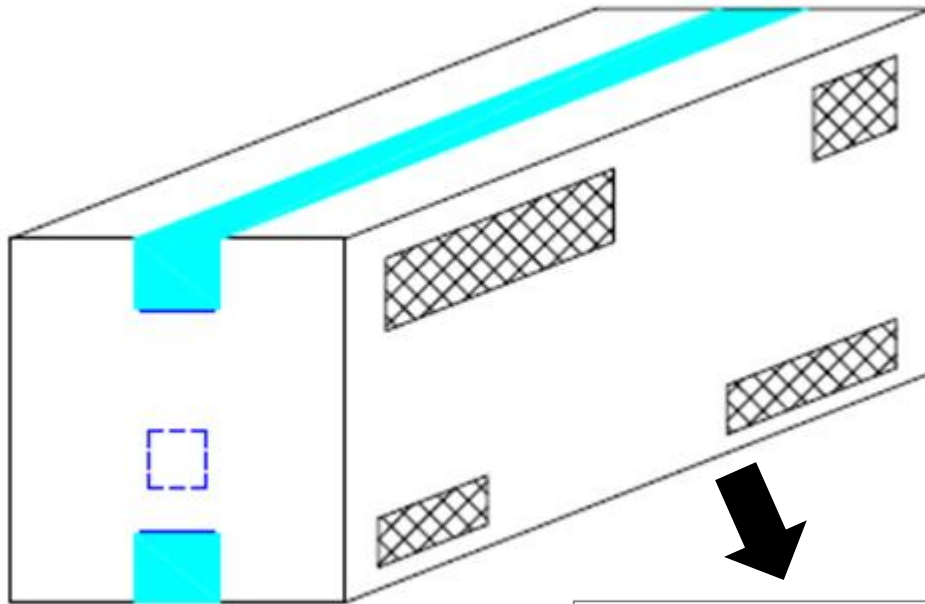
**BOX SPECIFICATIONS (Tube Type)**

**Inner Box**

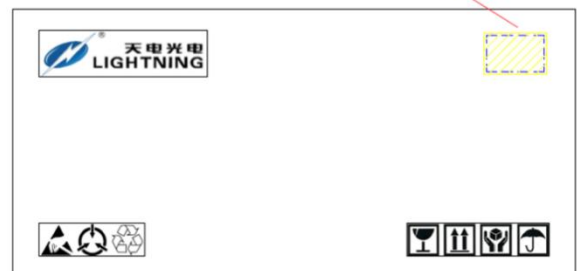


- L x W x H = 52.5cm x 10.7cm x 4.7cm

**Outer Box**



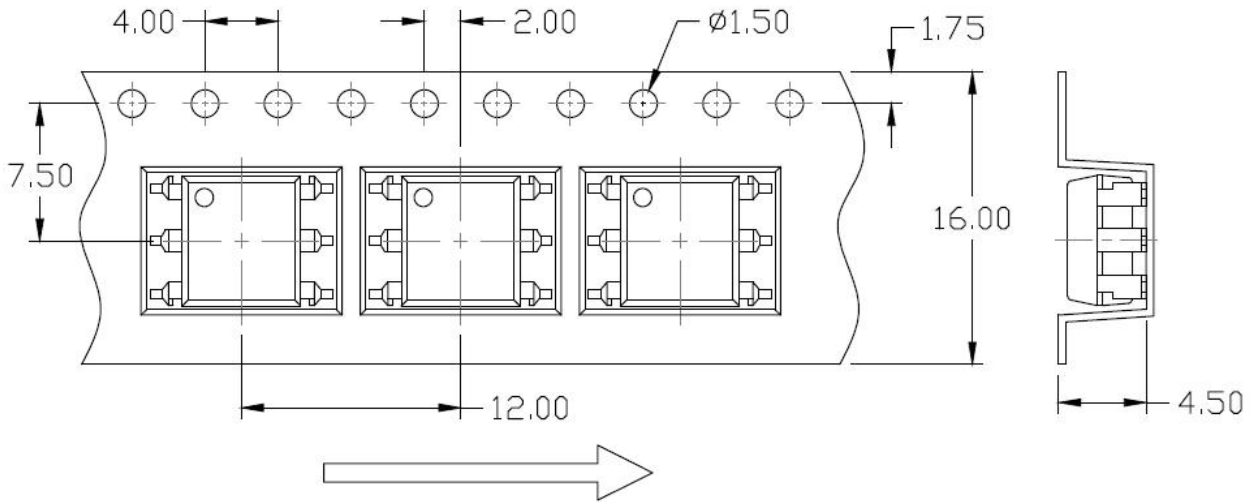
- L x W x H = 53.5cm x 23.5cm x 25.5cm



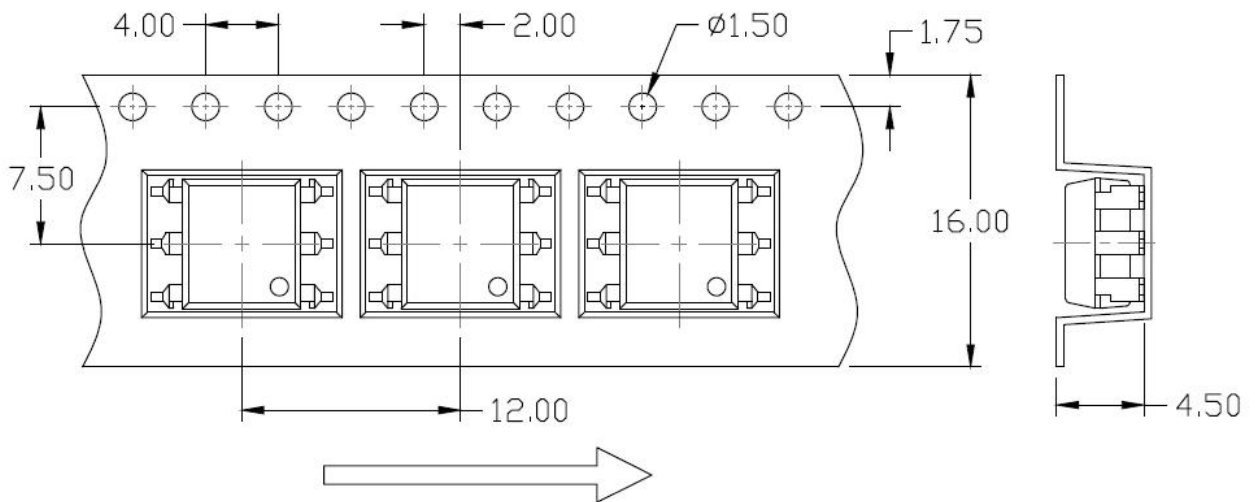
**DIP6, DC Input, Schmitt Trigger Photo Coupler**

**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option S(T1)**



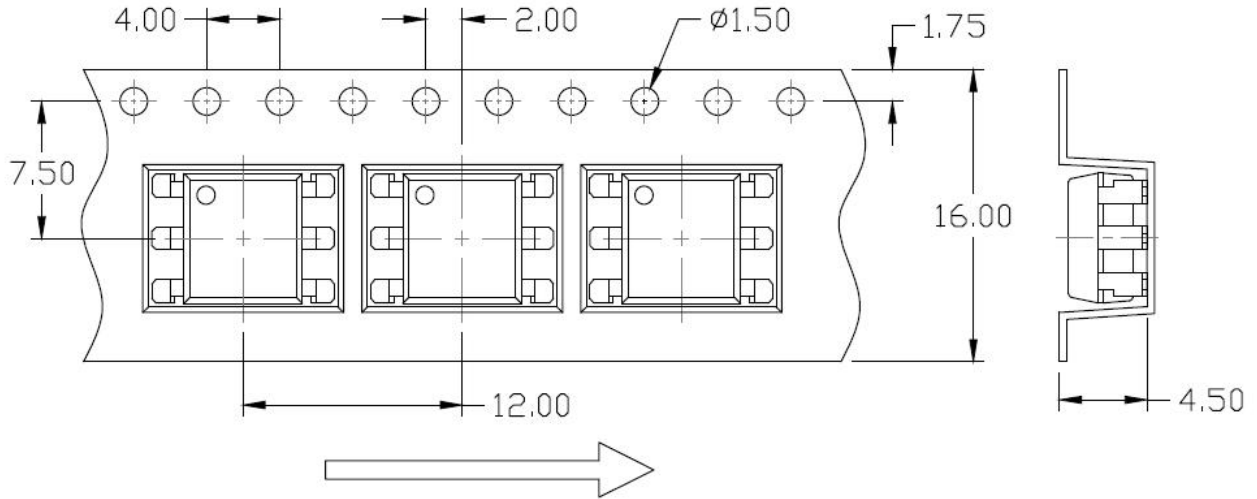
**Option S(T2)**



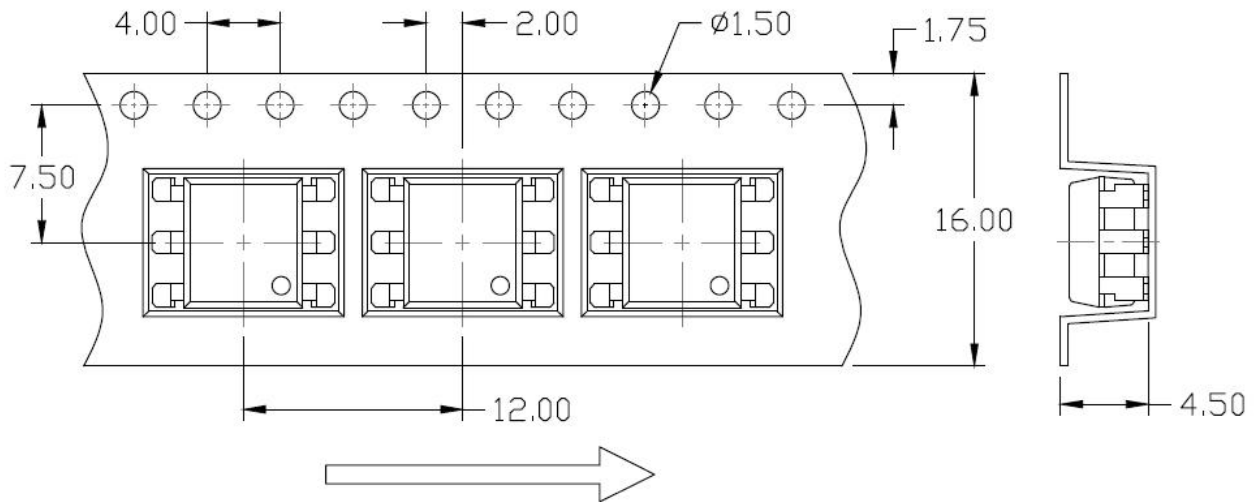
**DIP6, DC Input, Schmitt Trigger Photo Coupler**

**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option SL(T1)**



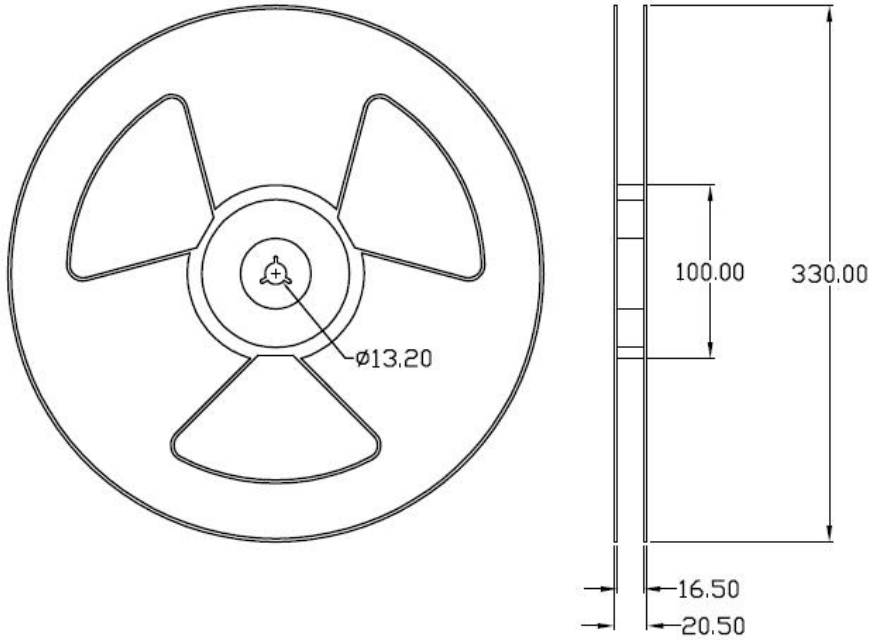
**Option SL(T2)**



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**REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

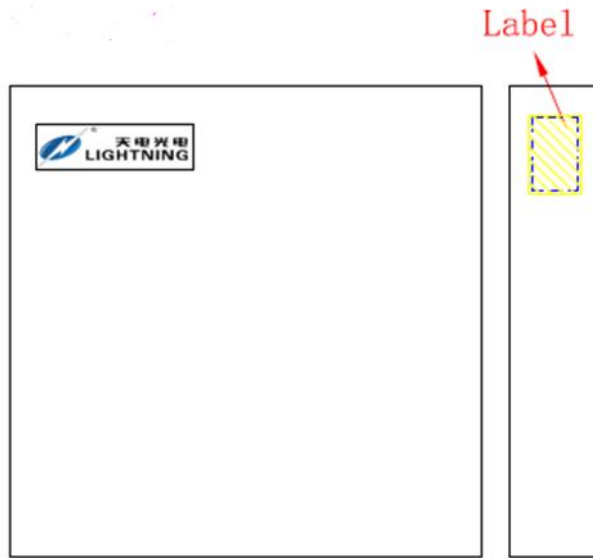
**Option S & Option SL**



**DIP6, DC Input, Schmitt Trigger Photo Coupler**

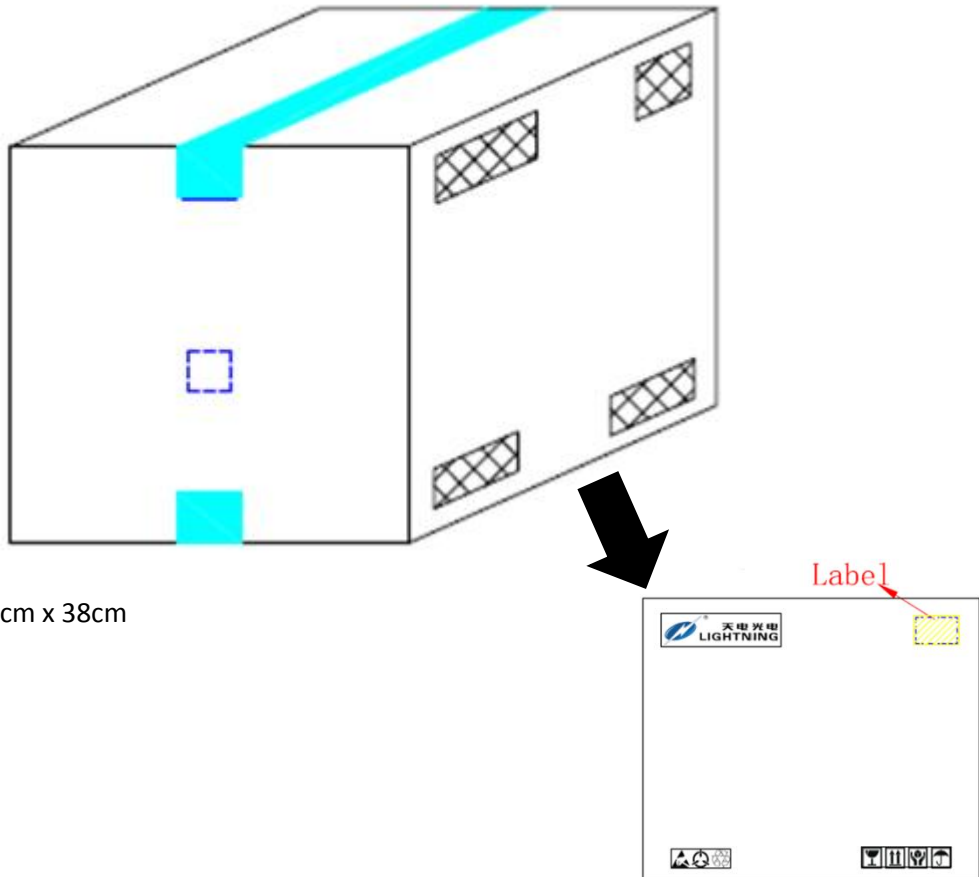
**BOX SPECIFICATIONS (Reel Type)**

**Inner Box**



- L x W x H = 36cm x 36cm x 6.9cm

**Outer Box**



- L x W x H = 45cm x 38cm x 38cm

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**ORDERING AND MARKING INFORMATION**

**MARKING INFORMATION**



**TD** : Company Abbr.  
**H11LX** : Part Number & Rank  
**V** : VDE Option  
**Y** : Fiscal Year  
**A** : Manufacturing Code  
**WW** : Work Week

**ORDERING INFORMATION**

**LABEL INFORMATION**

**H11LX(Y)(Z)-GV**



TD – Company Abbr.  
 H11LX – Part Number (X=1/2/3)  
 Y – Lead Form Option (M/S/SL/None)  
 Z – Tape and Reel Option (T1/T2)  
 G – Green Option (G or None)  
 V – VDE Option (V or None)

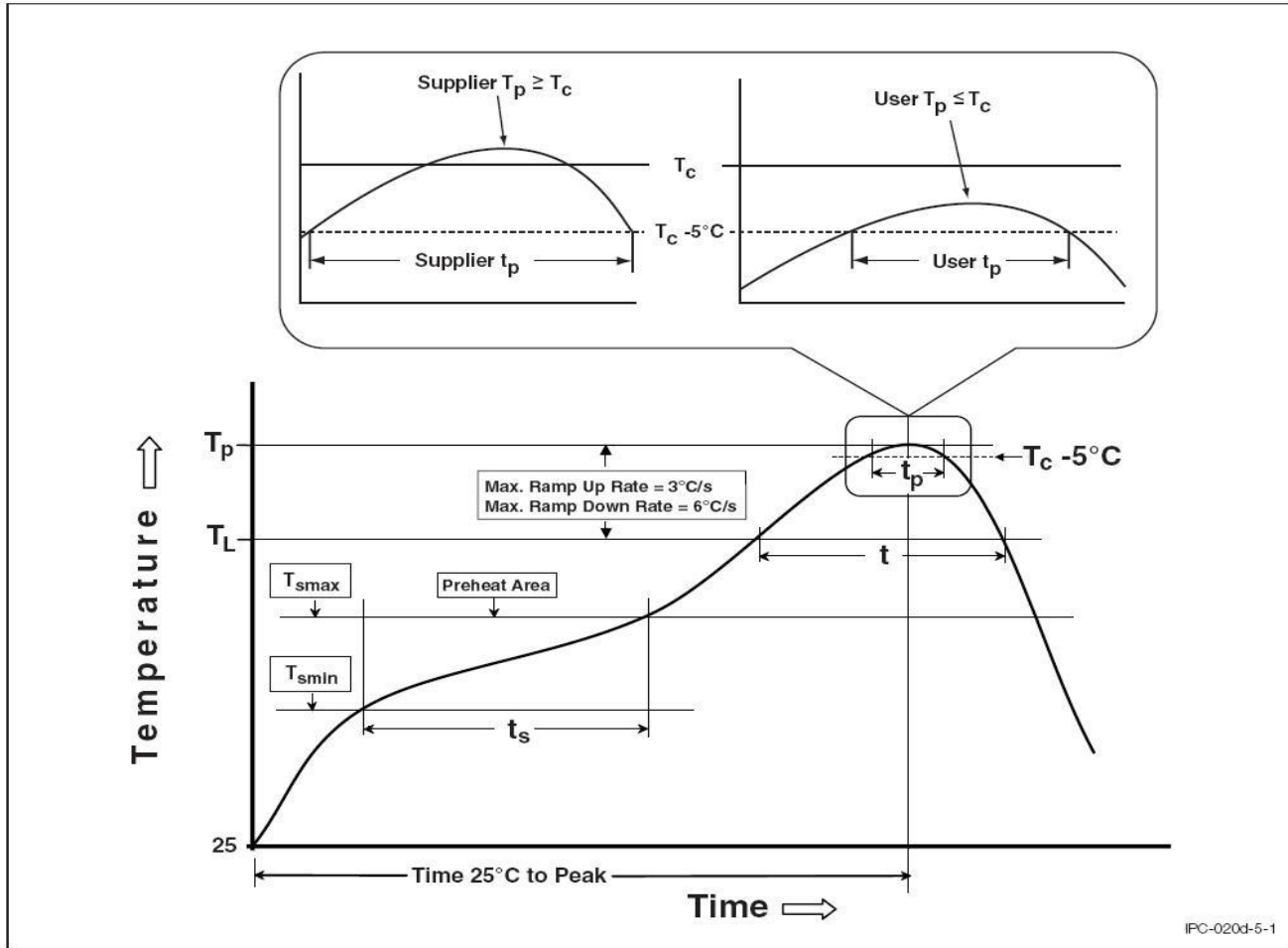
**Packing Quantity**

Option	Quantity	Quantity – Inner box	Quantity – Outer box
None	65 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 20.8k Units
M	65 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 20.8k Units
S(T1)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
S(T2)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SL(T1)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SL(T2)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units

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**REFLOW INFORMATION**

**REFLOW PROFILE**



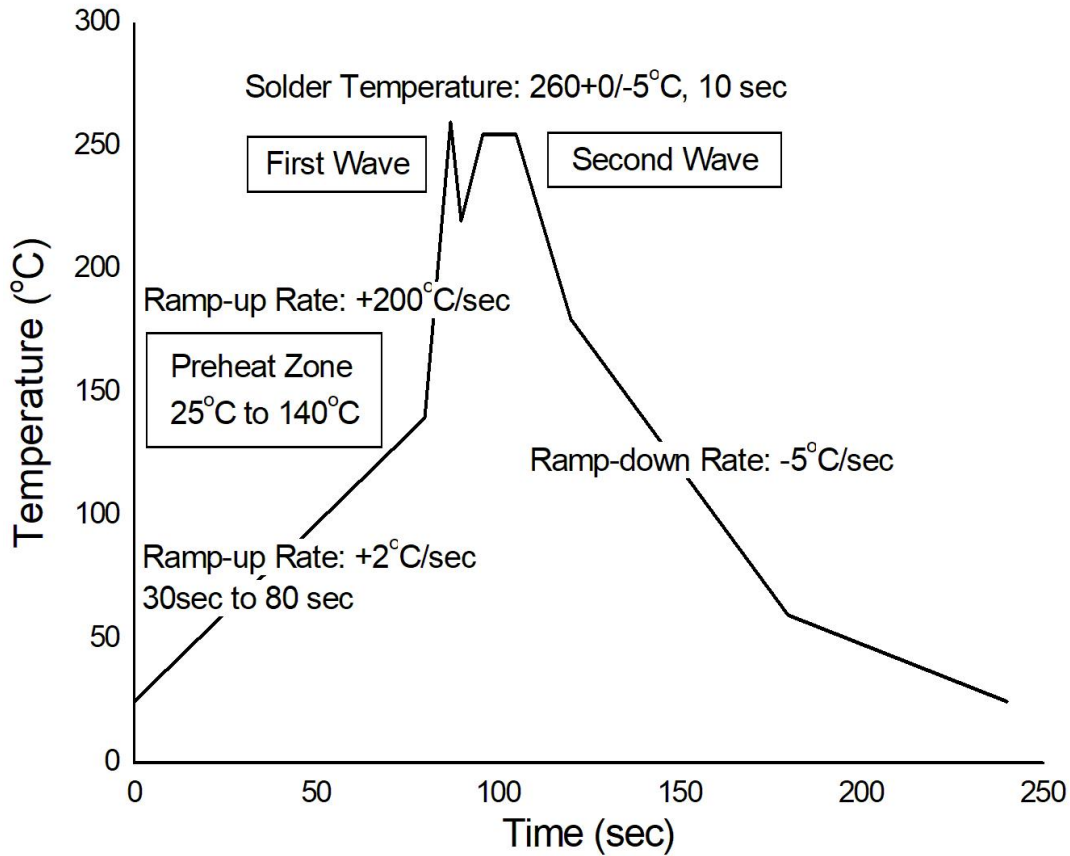
Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. ( $T_{smin}$ )	100	150°C
Temperature Max. ( $T_{smax}$ )	150	200°C
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60-120 seconds	60-120 seconds
Ramp-up Rate ( $t_L$ to $t_P$ )	3°C/second max.	3°C/second max.
Liquidous Temperature ( $T_L$ )	183°C	217°C
Time ( $t_L$ ) Maintained Above ( $T_L$ )	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time ( $t_P$ ) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate ( $T_P$ to $T_L$ )	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.



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**TEMPERATURE PROFILE OF SOLDERING**

**WAVE SOLDERING (JESD22-A111 COMPLIANT)**



**HAND SOLDERING BY SOLDERING IRON**

Soldering Temperature	380+0/-5°C
Soldering Time	3 sec max.

- One time soldering is recommended for all soldering method.
- Do not solder more than three times for IR reflow soldering.





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**DISCLAIMER**

- LIGHTNING is continually improving the quality, reliability, function and design. LIGHTNING reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- LIGHTNING makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, LIGHTNING disclaims (a) any and all liability arising out of the application or use of any product, (b) any and all liability, including without limitation special, consequential or incidental damages, and (c) any and all implied warranties, including warranties of fitness for particular
- 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 purpose, non-infringement and merchantability.
- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact LIGHTNING sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
- Parameters provided in datasheets may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated in each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify LIGHTNING's terms and conditions of purchase, including but not limited to the warranty expressed therein.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.