

## Features

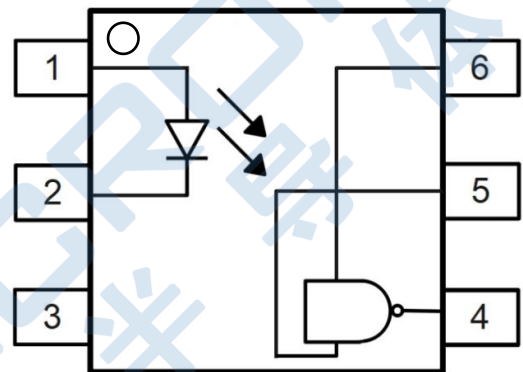
- High isolation 5000 V<sub>RMS</sub>
- DC input with Schmitt trigger output
- Operating temperature range - 40 °C to 100 °C
- REACH & RoHS compliance
- MSL class 1
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC - GB4943.1

## 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

## Description

The H11LXX 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.



**Truth Table**

| Input | Output |
|-------|--------|
| H     | L      |
| L     | H      |



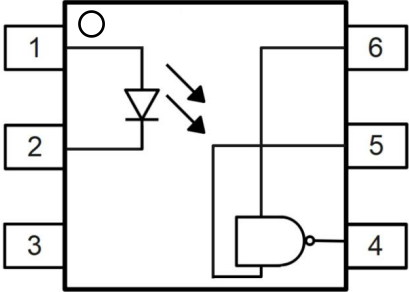
## ORDERING INFORMATION

| Outline                                                                             | Part Number | Package | Marking             | Packing | Packing Size | Quantity |
|-------------------------------------------------------------------------------------|-------------|---------|---------------------|---------|--------------|----------|
|  | H11LX0-E    | DIP6    | H11LX<br>/YYWW<br>A | Tube    | 500mm        | 65       |
|  | H11LX1-E    | DIP6-M  |                     | Tube    | 500mm        | 65       |
|  | H11LX5-E    | DIP6-SL |                     | Reel    | 13 "         | 1000     |

## CONTENTS

|                                          |    |
|------------------------------------------|----|
| Pin Configuration And Functions. ....    | 3  |
| Absolute Maximum Ratings. ....           | 3  |
| Electrical Optical Characteristics. .... | 4  |
| Characteristic Curves. ....              | 5  |
| Package Dimensions. ....                 | 6  |
| Recommended Solder Mask. ....            | 8  |
| Carrier Tape Specifications. ....        | 9  |
| Ordering And Marking Information. ....   | 10 |
| Reflow Information. ....                 | 11 |
| Temperature Profile Of Soldering. ....   | 12 |
| Disclaimer. ....                         | 13 |

### PIN CONFIGURATION AND FUNCTIONS

|  | Pin | Name             |
|-----------------------------------------------------------------------------------|-----|------------------|
|                                                                                   | 1   | Anode            |
|                                                                                   | 2   | Cathode          |
|                                                                                   | 3   | NC               |
|                                                                                   | 4   | V <sub>OUT</sub> |
|                                                                                   | 5   | GND              |
|                                                                                   | 6   | V <sub>CC</sub>  |

### ABSOLUTE MAXIMUM RATINGS

| Parameter                | Symbol                | Value   | Unit             | Note |
|--------------------------|-----------------------|---------|------------------|------|
| INPUT                    |                       |         |                  |      |
| Forward Current          | I <sub>F</sub>        | 60      | mA               |      |
| Peak Transient Current   | I <sub>F(trans)</sub> | 1       | A                | 1    |
| Reverse Voltage          | V <sub>R</sub>        | 6       | V                |      |
| Input Power Dissipation  | P <sub>I</sub>        | 120     | 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>O</sub>        | 50      | mA               |      |
| Output Power Dissipation | P <sub>O</sub>        | 150     | mW               |      |
| COMMON                   |                       |         |                  |      |
| Total Power Dissipation  | P <sub>tot</sub>      | 250     | mW               |      |
| Isolation Voltage        | V <sub>iso</sub>      | 5000    | V <sub>rms</sub> | 2    |
| Operating Temperature    | T <sub>opr</sub>      | -40~100 | °C               |      |
| Storage Temperature      | T <sub>stg</sub>      | -55~125 | °C               |      |
| Soldering Temperature    | T <sub>sol</sub>      | 260     | °C               | 3    |

Note 1. ≤1μs P.W,300pps

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

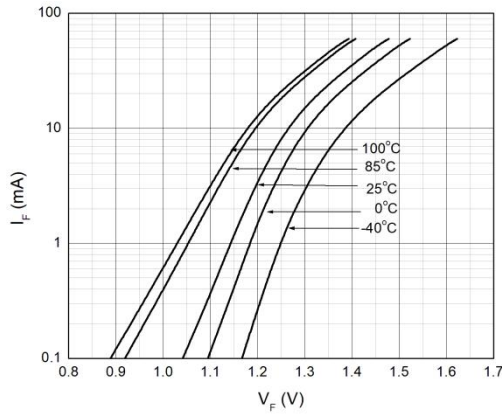
Note 3. For 10 seconds

**ELECTRICAL OPTICAL CHARACTERISTICS (T<sub>a</sub>=25°)**

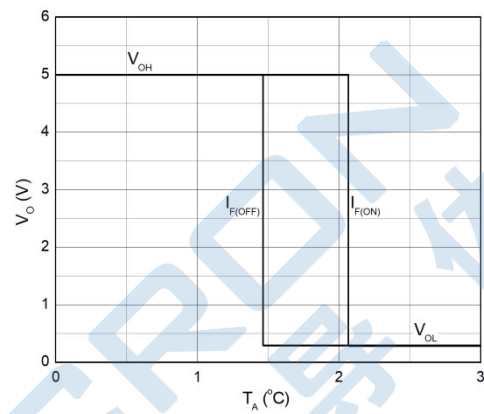
| Parameter                                              | Symbol               | Min              | Typ              | Max | Unit | Test Condition                                                                             |
|--------------------------------------------------------|----------------------|------------------|------------------|-----|------|--------------------------------------------------------------------------------------------|
| INPUT                                                  |                      |                  |                  |     |      |                                                                                            |
| Forward Voltage                                        | V <sub>F</sub>       | -                | 1.24             | 1.5 | V    | I <sub>F</sub> =10mA                                                                       |
| Reverse Current                                        | I <sub>R</sub>       | -                | -                | 10  | μA   | V <sub>R</sub> =5V                                                                         |
| Input Capacitance                                      | C <sub>in</sub>      | -                | 60               | -   | pF   | V=0, f=1MHz                                                                                |
| OUTPUT                                                 |                      |                  |                  |     |      |                                                                                            |
| Operation Voltage Range                                | V <sub>CC</sub>      | 3                | -                | 15  | V    |                                                                                            |
| Off State Supply Current                               | I <sub>CC(off)</sub> | -                | 1.6              | 5   | mA   | I <sub>F</sub> =0mA, V <sub>CC</sub> =5V                                                   |
| On State Supply Current                                | I <sub>CC(on)</sub>  | -                | 1.6              | 5   | mA   | I <sub>F</sub> =10mA, V <sub>CC</sub> =5V                                                  |
| High Level Output Current                              | I <sub>OH</sub>      | -                | -                | 100 | μA   | I <sub>F</sub> =10mA, V <sub>CC</sub> =V <sub>O</sub> =15V                                 |
| TRANSFER CHARACTERISTICS (T <sub>a</sub> =-40 to 85°C) |                      |                  |                  |     |      |                                                                                            |
| Low Level Output Voltage                               | V <sub>OL</sub>      | -                | 0.35             | 0.6 | V    | V <sub>CC</sub> =5.5V, I <sub>F</sub> =5mA,<br>V <sub>E</sub> =2.0V, I <sub>CL</sub> =13mA |
| Turn On<br>Threshold Current                           | H11L1                | I <sub>Fon</sub> | -                | -   | 1.6  | V <sub>CC</sub> =5V, R <sub>L</sub> =270Ω                                                  |
|                                                        | H11L2                |                  | -                | -   | 10   |                                                                                            |
|                                                        | H11L3                |                  | -                | -   | 5    |                                                                                            |
| Turn Off Threshold Current                             | I <sub>Foff</sub>    | -                | 1                | -   | mA   | V <sub>CC</sub> =5V, R <sub>L</sub> =270Ω                                                  |
| Turn On Time                                           | t <sub>on</sub>      | -                | -                | 4   | μs   | V <sub>CC</sub> =5V, I <sub>F</sub> =I <sub>Fon</sub> ,<br>R <sub>L</sub> =270Ω            |
| Fall Time                                              | t <sub>f</sub>       | -                | 0.1              | -   | μs   |                                                                                            |
| Turn Off Time                                          | t <sub>off</sub>     | -                | -                | 4   | μs   |                                                                                            |
| Rise Time                                              | t <sub>r</sub>       | -                | 0.1              | -   | μs   |                                                                                            |
| Data Rate                                              |                      | -                | 1                | -   | MHz  |                                                                                            |
| Isolation Resistance                                   | R <sub>iso</sub>     | 10 <sup>12</sup> | 10 <sup>14</sup> | -   | Ω    | DC500V, 40 ~ 60% R.H.                                                                      |
| Floating Capacitance                                   | C <sub>IO</sub>      | -                | 0.3              | 1   | pF   | V=0, f=1MHz                                                                                |

## CHARACTERISTIC CURVES

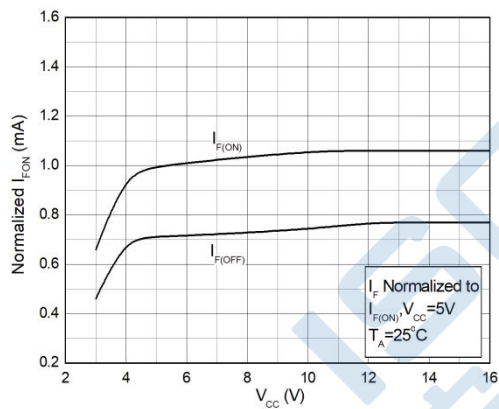
**Fig.1 Forward Current vs. Forward Voltage**



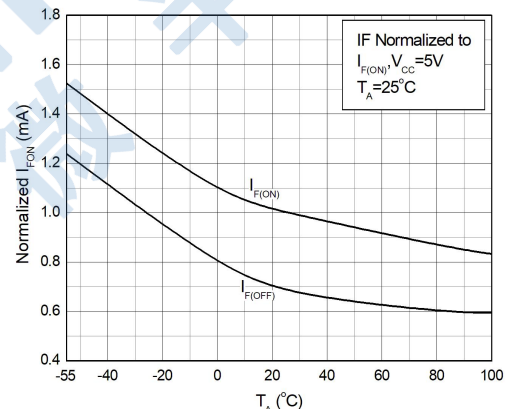
**Fig.2 Output Voltage vs. Forward Current**



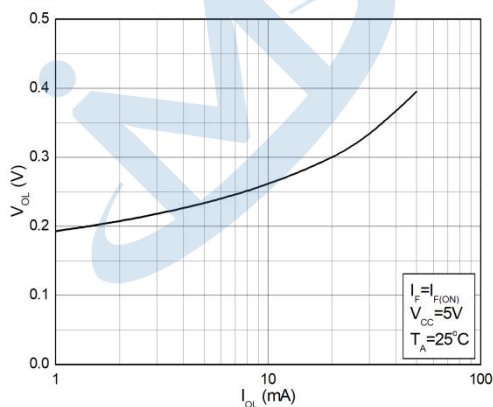
**Fig.3 Normalized Turn on Threshold Current vs. Supply Voltage**



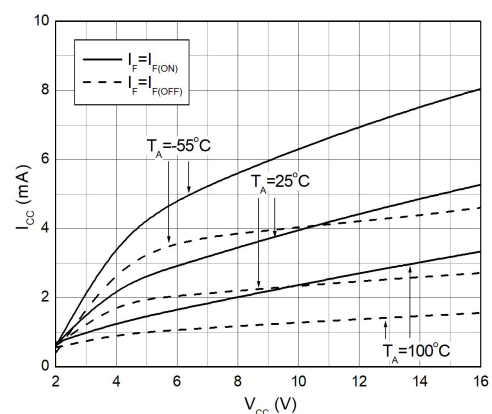
**Fig.4 Normalized Turn on Threshold Current vs. Ambient Temperature**



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

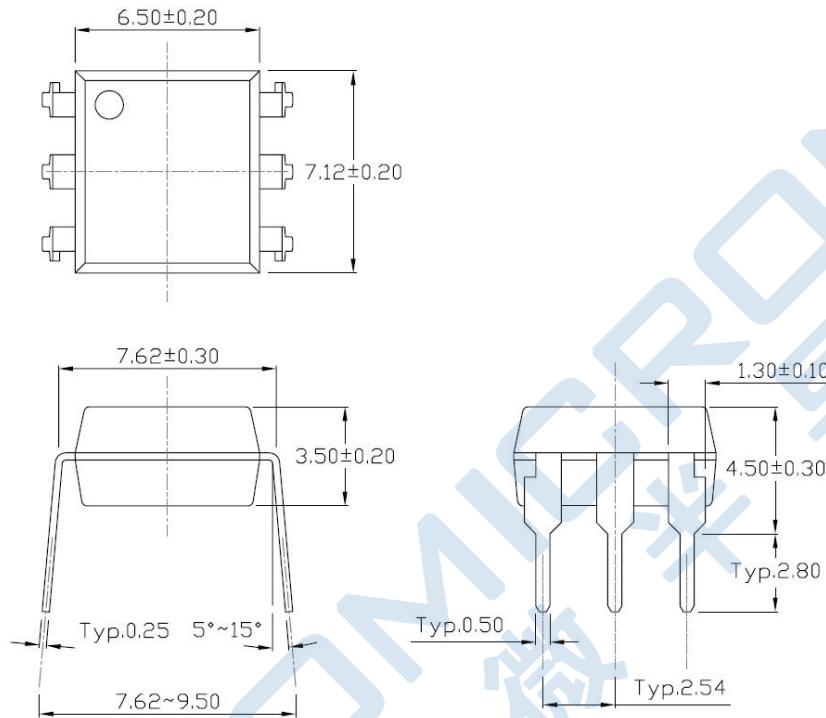


**Fig.6 Supply Current vs. Supply Voltage**

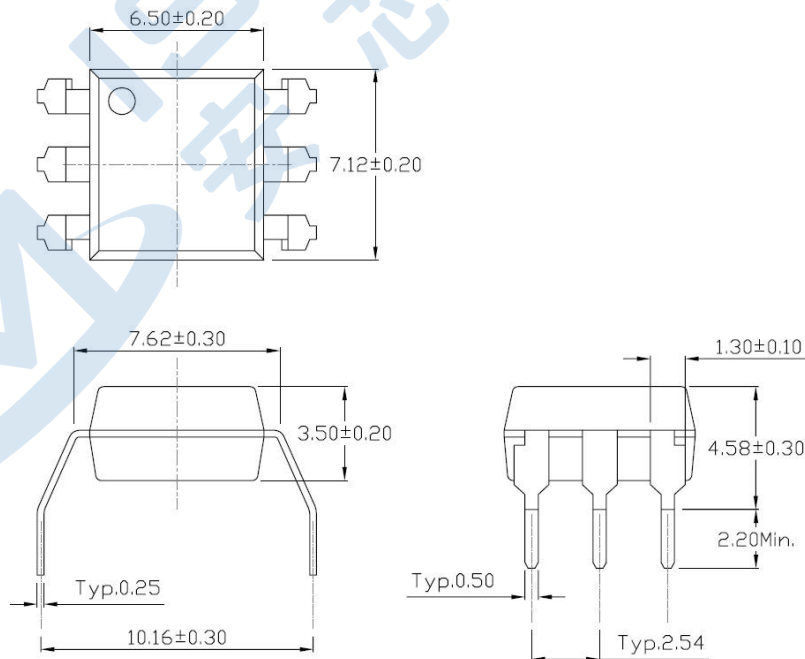


**PACKAGE DIMENSIONS**

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



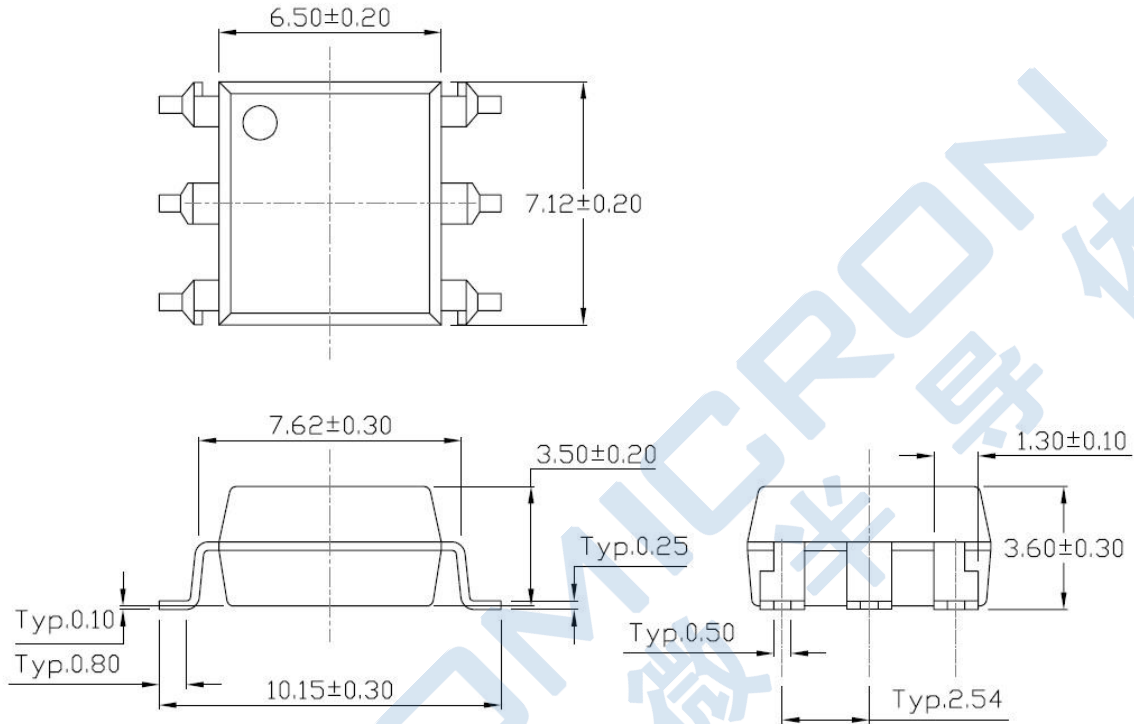
**Gullwing (400mil) Lead Forming – Through Hole (M Type)**



- Dimensions in mm unless otherwise stated

## PACKAGE DIMENSIONS

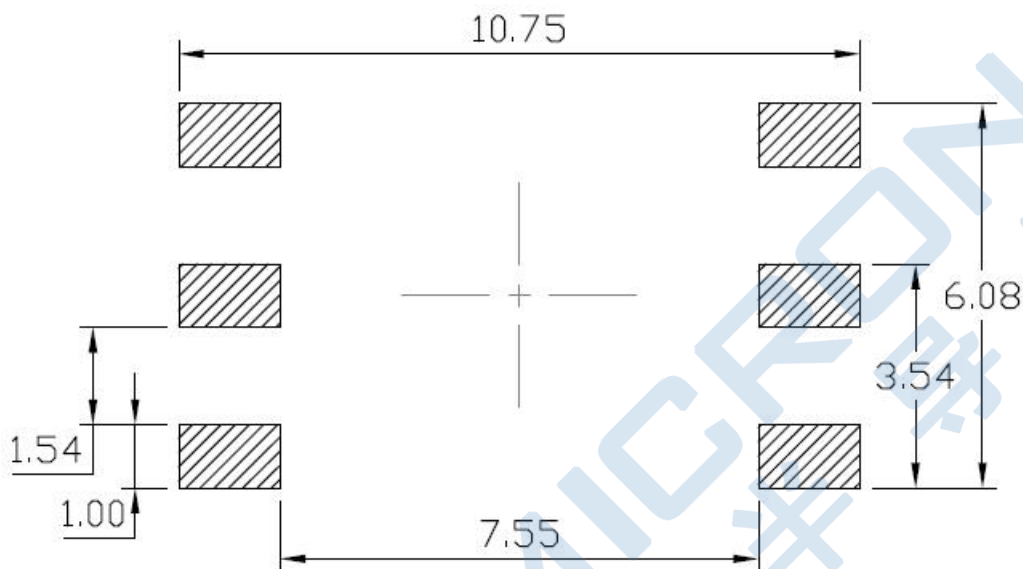
### Surface Mount (Low Profile) Lead Forming (SL Type)



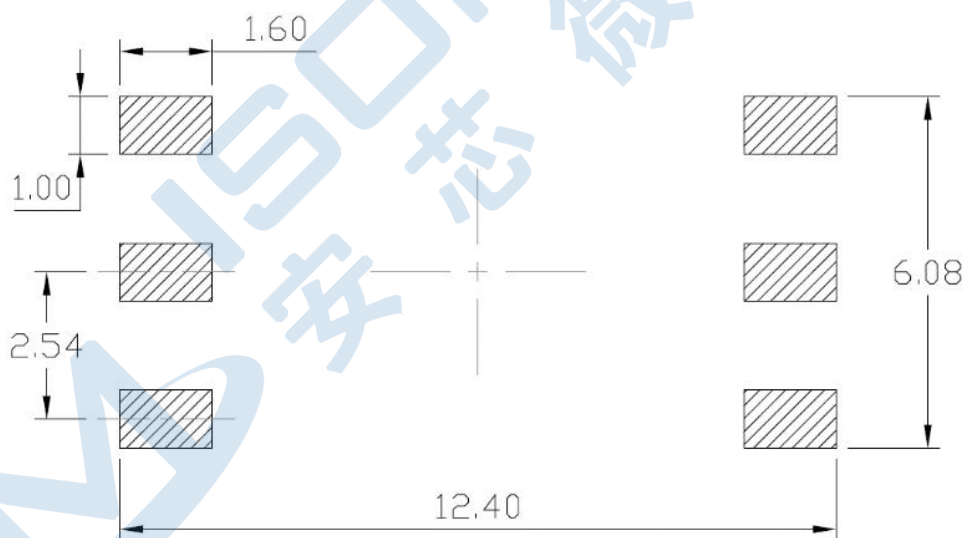
- Dimensions in mm unless otherwise stated

### RECOMMENDED SOLDER MASK

#### Surface Mount (Low Profile) Lead Forming



#### Surface Mount (Gullwing) Lead Forming

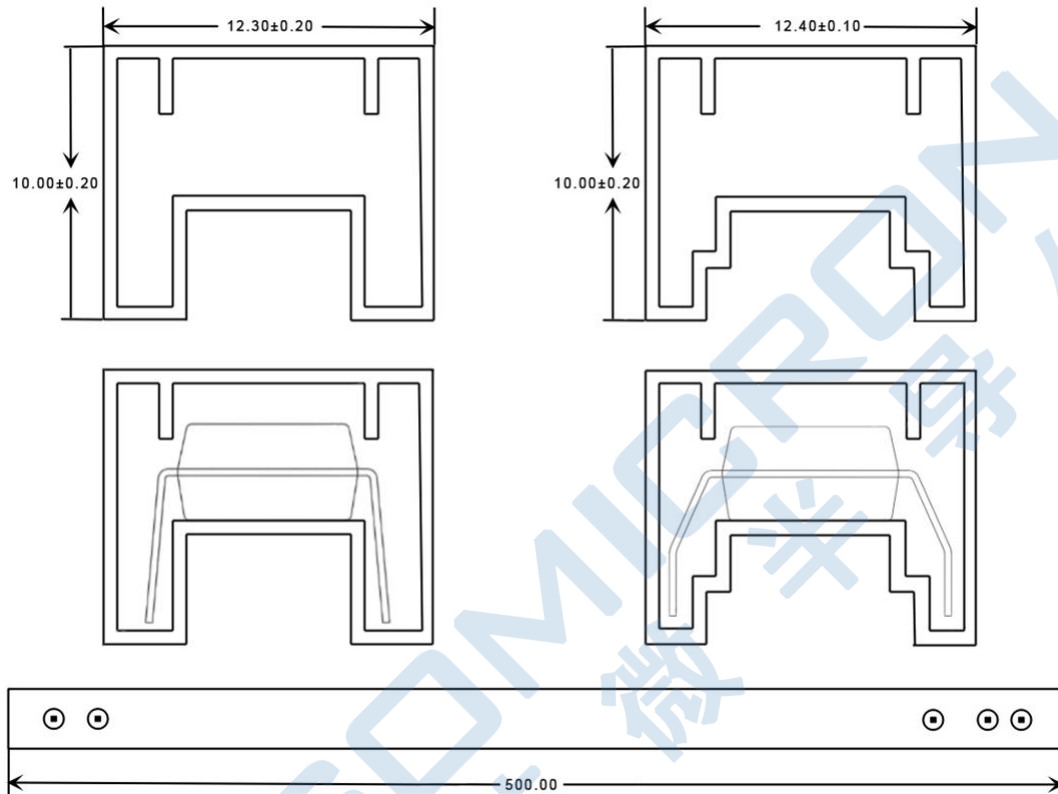


- Dimensions in mm unless otherwise stated

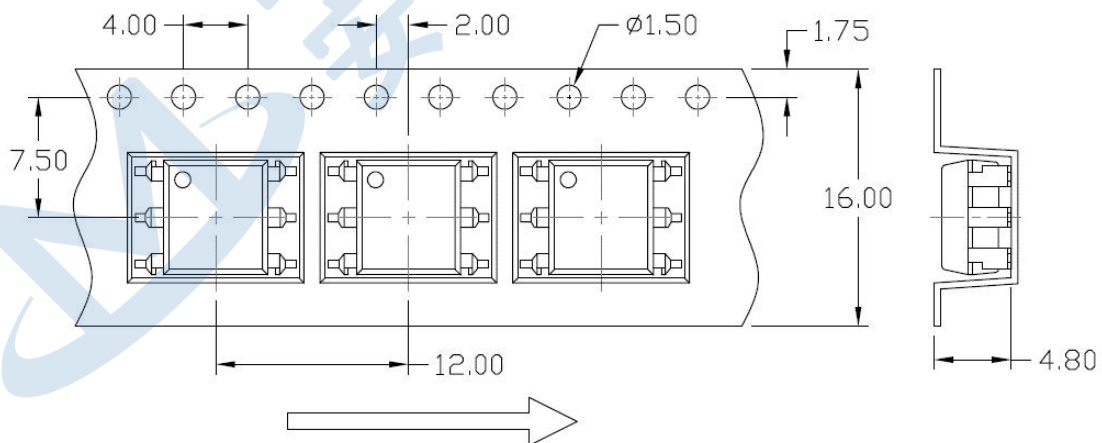


## CARRIER TAPE SPECIFICATIONS

### Option DIP6 & DIP6-M



### Option DIP6-SL



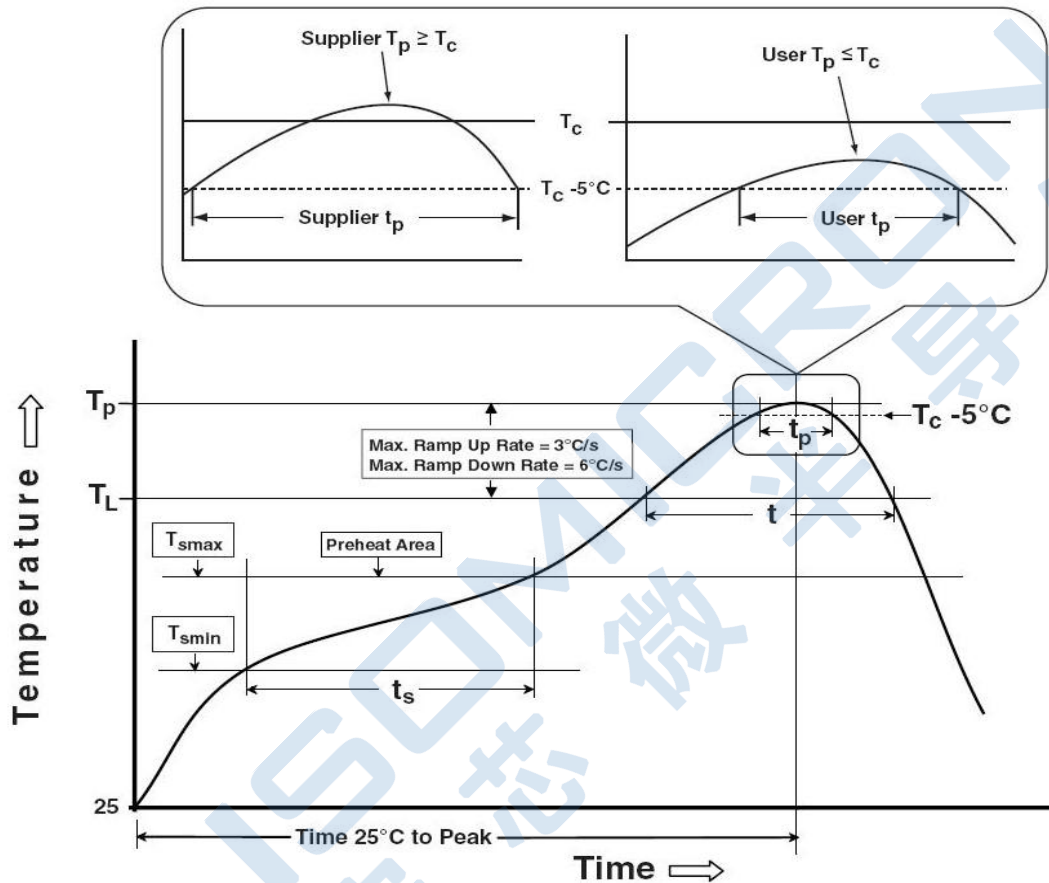
- Dimensions in mm unless otherwise stated

## ORDERING AND MARKING INFORMATION

| Marking Information                                                                                                                                       |                 |                                                                                                                                                                                                                                                                                                                                                                  |                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
|                                                                          |                 | <div><div>H11L</div><div>:</div><div>Part Number</div></div> <div><div>X</div><div>:</div><div>CTR Rank</div></div> <div><div>/</div><div>:</div><div>ISOMICRON</div></div> <div><div>YY</div><div>:</div><div>Fiscal Year</div></div> <div><div>WW</div><div>:</div><div>Work Week</div></div> <div><div>A</div><div>:</div><div>Manufacturing Code</div></div> |                                    |
| Order Code                                                                                                                                                |                 |                                                                                                                                                                                                                                                                                                                                                                  |                                    |
| <div><div>Part Number</div><div>Rank:</div><div>1/2/3</div><div>Lead Forming:</div><div>0: DIP-Standard</div><div>1: DIP-M</div><div>5: SM-SL</div></div> |                 | <div><div>H11L</div><div>X</div><div>X</div><div>-</div><div>X</div><div>Halogen Free:</div><div>E: Halogen-free,Lead-free</div><div>Z: Halogen, Lead-free</div></div>                                                                                                                                                                                           |                                    |
| Packing Quantity                                                                                                                                          |                 |                                                                                                                                                                                                                                                                                                                                                                  |                                    |
| Option                                                                                                                                                    | Quantity        | Quantity – Inner box                                                                                                                                                                                                                                                                                                                                             | Quantity – Outer box               |
| DIP-Standard                                                                                                                                              | 65 Units/Tube   | 20 Tubes/Inner box                                                                                                                                                                                                                                                                                                                                               | 6 Inner box/Outer box = 7.8k Units |
| DIP-M                                                                                                                                                     | 65 Units/Tube   | 20 Tubes/Inner box                                                                                                                                                                                                                                                                                                                                               | 6 Inner box/Outer box = 7.8k Units |
| SM-SL                                                                                                                                                     | 1000 Units/Reel | 2 Reels/Inner box                                                                                                                                                                                                                                                                                                                                                | 5 Inner box/Outer box = 10k Units  |

## REFLOW INFORMATION

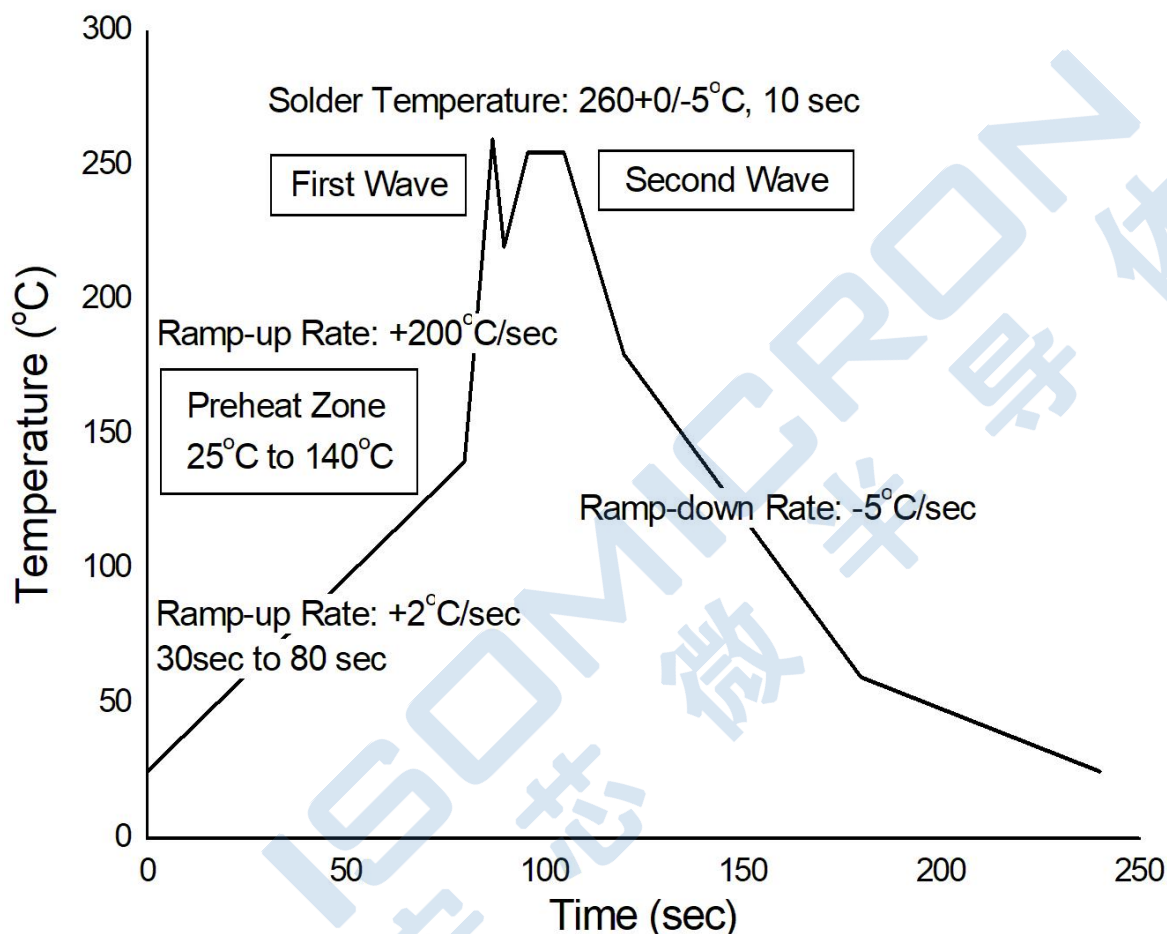
### Reflow Profile



| Profile Feature                                                       | Sn-Pb Assembly Profile | Pb-Free Assembly Profile |
|-----------------------------------------------------------------------|------------------------|--------------------------|
| Temperature Min. (T <sub>smin</sub> )                                 | 100                    | 150°C                    |
| Temperature Max. (T <sub>smax</sub> )                                 | 150                    | 200°C                    |
| Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> ) | 60-120 seconds         | 60-120 seconds           |
| Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )                      | 3°C/second max.        | 3°C/second max.          |
| Liquidous Temperature (T <sub>L</sub> )                               | 183°C                  | 217°C                    |
| Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )             | 60 – 150 seconds       | 60 – 150 seconds         |
| Peak Body Package Temperature                                         | 235°C +0°C / -5°C      | 260°C +0°C / -5°C        |
| Time (t <sub>P</sub> ) within 5°C of 260°C                            | 20 seconds             | 30 seconds               |
| Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )                    | 6°C/second max         | 6°C/second max           |
| Time 25°C to Peak Temperature                                         | 6 minutes max.         | 8 minutes max.           |

## 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.

## DISCLAIMER

- ISOMICRON is continually improving the quality, reliability, function and design. ISOMICRON reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- ISOMICRON 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, ISOMICRON 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 ISOMICRON 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 ISOMICRON'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.