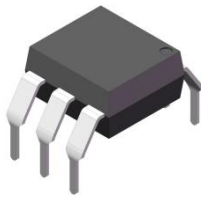


### Product packaging logic diagram



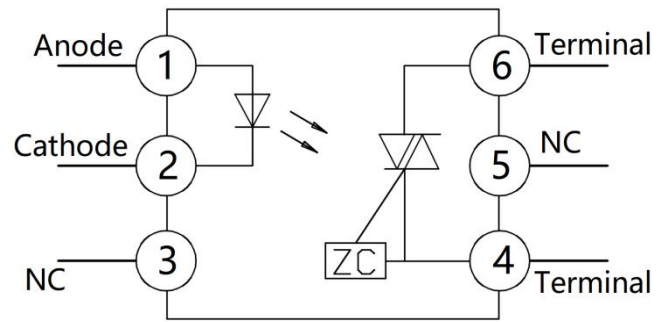
DIP6



DIP6-M



SMD6



Pin Configuration

### Features

- Peak breakdown voltage:  
250V: XL303X; 400V: XL304X;  
600V: XL306X; 800V: XL308X
- High isolation voltage between input and output (Viso =5000Vrms)
- Operating Temperature: -55°C~100°C
- Environmentally friendly products, compliant with CQC, UL, and VDE requirements

### Mechanical Data

- Case: DIP6, DIP6-M, SMD6
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solder ability-per MIL-STD-202, Method 208

### Applications

- Commonly used in motor speed control systems, Power regulation system and follow-up system, Control of high-power equipment through low-power controls.
- Mainly used for motor speed control and temperature control.
- In the power system for power switches, Charging pile control and battery management system (BMS), Achieve precise control of voltage/current and equipment protection.
- Vehicle power management, Drive motor control and charge/discharge management, Improving vehicle energy efficiency and safety.
- In fiber optic communication equipment, routers and medical devices, signal isolation and power control in the middle, Ensure stable operation of equipment.



### Ordering Information

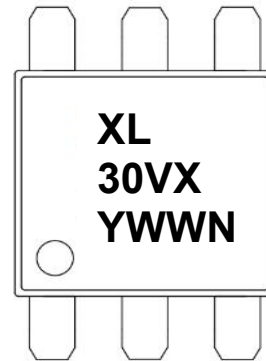
XL      30VX      (M)      (G)      -      (U)      (N)      (Y)  
 ①                  ②                  ③                  ④                  ⑤                  ⑥                  ⑦

- ① Brand(XL)
- ② Product series ( V:3,4,6,8; X:0,1,2,3,4 )
- ③ Package type (DIP6: None, DIP6-M: M,SMD6: S)
- ④ Halogen option (None :Halogen free)
- ⑤ Lead frame (None: Copper)
- ⑥ Customer option 1 (0-9 or A-Z or none)
- ⑦ Customer option 2 (0-9 or A-Z or none)

| Part Number                         | Package | Shipping Quantity     | Marking Code                      |
|-------------------------------------|---------|-----------------------|-----------------------------------|
| XL30V <sup>1</sup> X <sup>2</sup>   | DIP6    | 65pcs / Tube          | XL30V <sup>1</sup> X <sup>2</sup> |
| XL30V <sup>1</sup> X <sup>2</sup> M | DIP6-M  | 65pcs / Tube          | XL30V <sup>1</sup> X <sup>2</sup> |
| XL30V <sup>1</sup> X <sup>2</sup> S | SMD6    | 1000pcs / Tape & Reel | XL30V <sup>1</sup> X <sup>2</sup> |

### Marking Information

- " XL" denotes brand
- " V" denotes VDRM digit: 3, 4, 6, 8
- " X" denotes IFT digit: 0, 1, 2, 3, 4
- " Y" denotes Year : A(2024), B(2025), C(2026)
- " WW" denotes Week' s number
- " N" denotes the day of Week



**Maximum Ratings** (@ T<sub>A</sub> = 25°C unless otherwise specified)

| Parameter |                                                 |        | Symbol              | Value | Unit  |
|-----------|-------------------------------------------------|--------|---------------------|-------|-------|
| Input     | Forward Current                                 |        | I <sub>F</sub>      | 60    | mA    |
|           | Reverse Voltage                                 |        | V <sub>R</sub>      | 6     | V     |
|           | Power Dissipation                               |        | P <sub>D</sub>      | 100   | mW    |
|           | Derating factor (above Ta = 85 °C)              |        |                     | 3.8   | mW/°C |
| Output    | Power Dissipation                               |        | P <sub>C</sub>      | 300   | mW    |
|           | Derating factor (above Ta = 85 °C)              |        |                     | 7.6   | mW/°C |
|           | Off-state Output Terminal Voltage               | XL303X | V <sub>DRM</sub>    | 250   | V     |
|           |                                                 | XL304X |                     | 400   |       |
|           |                                                 | XL306X |                     | 600   |       |
|           |                                                 | XL308X |                     | 800   |       |
|           | Peak repetitive surge current (pw=100μs,120pps) |        | I <sub>TSM</sub>    | 1     | A     |
|           | Turn-on current (root mean square value)        |        | I <sub>T(RMS)</sub> | 100   | mA    |

**Thermal Characteristics**

| Parameter                 | Symbol           | Value      | Unit             |
|---------------------------|------------------|------------|------------------|
| Total Power Dissipation   | P <sub>TOT</sub> | 350        | mW               |
| Isolation Voltage *2      | V <sub>ISO</sub> | 5000       | V <sub>rms</sub> |
| Operating Temperature     | T <sub>OPR</sub> | -55 ~ +100 | °C               |
| Storage Temperature Range | T <sub>STG</sub> | -55 ~ +125 | °C               |
| Soldering Temperature *3  | T <sub>SOL</sub> | 260        | °C               |

**Notes:**

1. Pulse width ≤ 1μs, Duty ratio: 0.001
2. 40 to 60% RH, AC for 1 minute. At this time, pins 1, 2 & 3 are shorted, and pins 4, 5 & 6 are shorted together.
3. For 10 seconds

**Electrical Characteristics** (@ T<sub>A</sub> = 25°C unless otherwise specified)

| Parameter                |                                                                             |        | Symbol            | Test Condition                                                                                  | Min. | Typ. | Max. | Unit |
|--------------------------|-----------------------------------------------------------------------------|--------|-------------------|-------------------------------------------------------------------------------------------------|------|------|------|------|
| Input                    | Forward Voltage                                                             |        | V <sub>F</sub>    | I <sub>F</sub> =20mA                                                                            | -    | 1.2  | 1.4  | V    |
|                          | Reverse Leakage current                                                     |        | I <sub>R</sub>    | V <sub>R</sub> =6V                                                                              | -    | -    | 10   | μA   |
| Output                   | Peak Blocking Current                                                       | XL303X | I <sub>DRM</sub>  | V <sub>DRM</sub> =Rated V <sub>DRM</sub> ,<br>I <sub>F</sub> = 0mA                              | -    | -    | 100  | nA   |
|                          |                                                                             | XL304X |                   |                                                                                                 | -    | -    | 100  |      |
|                          |                                                                             | XL306X |                   |                                                                                                 | -    | -    | 500  |      |
|                          |                                                                             | XL308X |                   |                                                                                                 | -    | -    | 500  |      |
|                          | Peak on-state voltage                                                       |        | V <sub>TM</sub>   | I <sub>TM</sub> =100mA,<br>I <sub>F</sub> =Rated I <sub>FT</sub>                                | -    | -    | 3    | V    |
|                          | Critical Rate of Rise off-state Voltage                                     | XL303X | dv/dt             | V <sub>PEAK</sub> =Rated V <sub>DRM</sub> ,<br>I <sub>F</sub> = 0mA                             | 1000 | -    | -    | V/μs |
|                          |                                                                             | XL304X |                   |                                                                                                 | -    | -    | -    |      |
|                          |                                                                             | XL306X |                   |                                                                                                 | -    | -    | -    |      |
|                          |                                                                             | XL308X |                   |                                                                                                 | 600  | -    | -    |      |
|                          | Inhibition voltage<br>(MT1-MT2 voltage above which device will not trigger) |        | V <sub>Inh</sub>  | I <sub>F</sub> = Rated I <sub>FT</sub>                                                          |      |      | 20   | V    |
|                          | Leakage in Inhibited State                                                  |        | I <sub>DRM2</sub> | I <sub>F</sub> = Rated I <sub>FT</sub><br>V <sub>DRM</sub> =Rated V <sub>DRM</sub><br>off state |      |      | 500  | μA   |
| Transfer Characteristics | LED trigger current                                                         | XL3031 | I <sub>FT</sub>   | Main terminal voltage = 3V                                                                      | -    | -    | 15   | mA   |
|                          |                                                                             | XL3041 |                   |                                                                                                 | -    | -    | 15   |      |
|                          |                                                                             | XL3061 |                   |                                                                                                 | -    | -    | 15   |      |
|                          |                                                                             | XL3081 |                   |                                                                                                 | -    | -    | 15   |      |
|                          |                                                                             | XL3032 |                   |                                                                                                 | -    | -    | 10   |      |
|                          |                                                                             | XL3042 |                   |                                                                                                 | -    | -    | 10   |      |
|                          |                                                                             | XL3062 |                   |                                                                                                 | -    | -    | 10   |      |
|                          |                                                                             | XL3082 |                   |                                                                                                 | -    | -    | 10   |      |
|                          |                                                                             | XL3033 |                   |                                                                                                 | -    | -    | 5    |      |
|                          |                                                                             | XL3043 |                   |                                                                                                 | -    | -    | 5    |      |
|                          |                                                                             | XL3063 |                   |                                                                                                 | -    | -    | 5    |      |
|                          |                                                                             | XL3083 |                   |                                                                                                 | -    | -    | 5    |      |
|                          |                                                                             | XL3034 |                   |                                                                                                 | -    | -    | 3    |      |
|                          |                                                                             | XL3044 |                   |                                                                                                 | -    | -    | 3    |      |
|                          |                                                                             | XL3064 |                   |                                                                                                 | -    | -    | 3    |      |
|                          |                                                                             | XL3084 |                   |                                                                                                 | -    | -    | 3    |      |
|                          | Holding Current                                                             |        | I <sub>H</sub>    |                                                                                                 | -    | 250  |      | μA   |

### Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Fig.1 LED Positive voltage vs Positive current

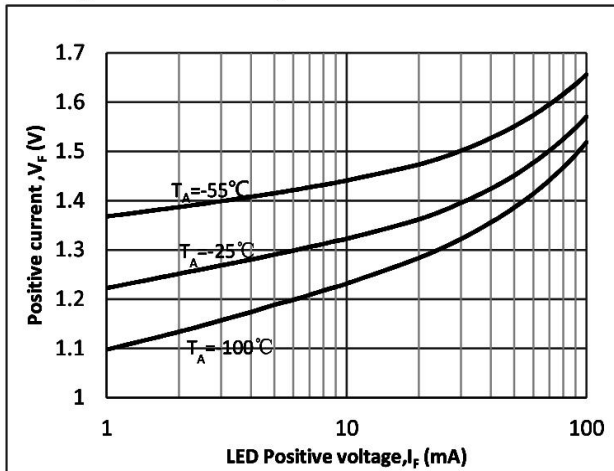


Fig.2 On-state characteristic

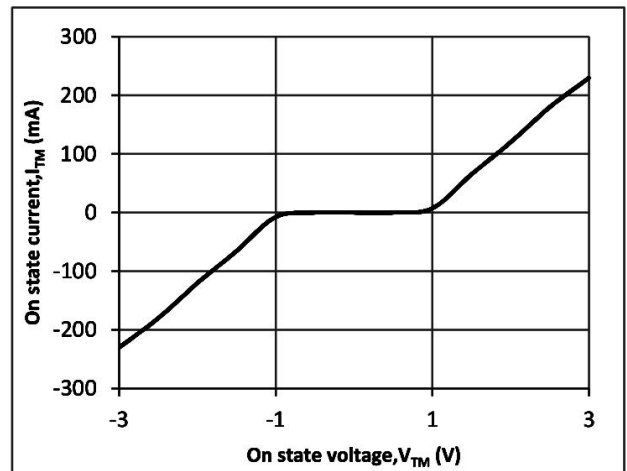


Fig.3 Trigger current vs Ambient temperature

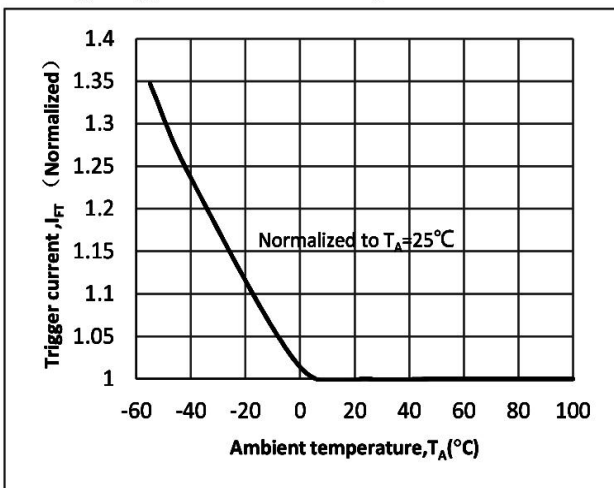


Fig.4 LED Trigger current vs LED Pulse Width

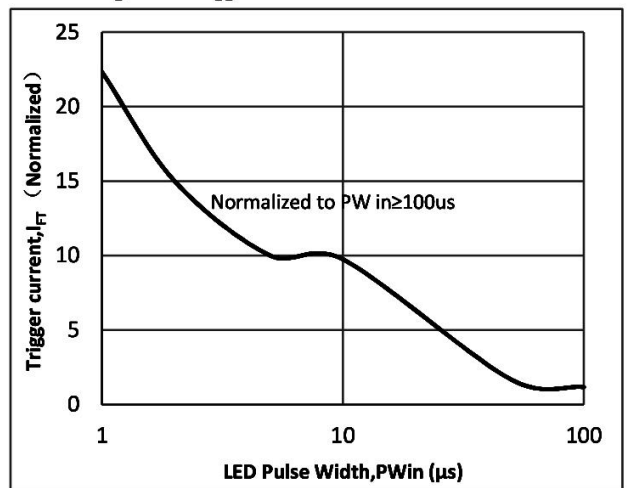


Fig.5 Holding current vs Temperature

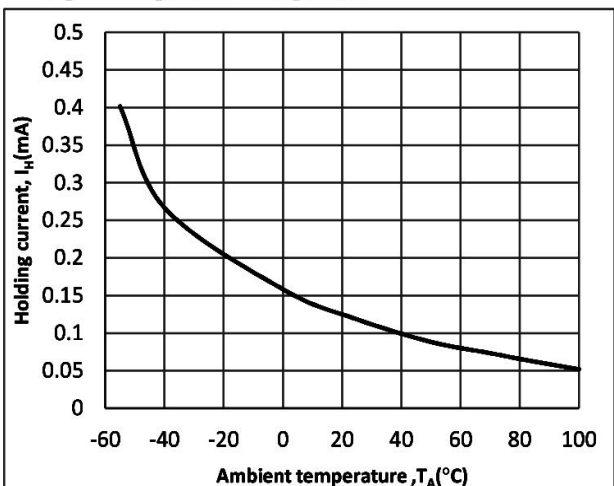
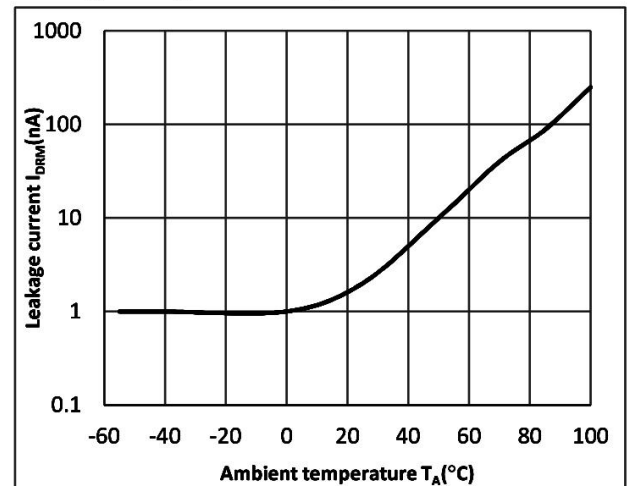


Fig.6 Leakage current vs Temperature



### Ratings and Characteristics Curves (@ T<sub>A</sub> = 25°C unless otherwise specified)

Fig.7 Inhibit state leakage current vs Ambient temperature

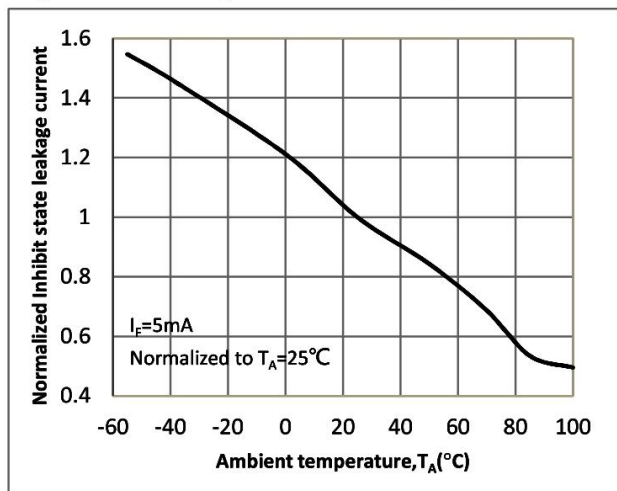


Fig.8 Inhibition voltage vs Ambient temperature

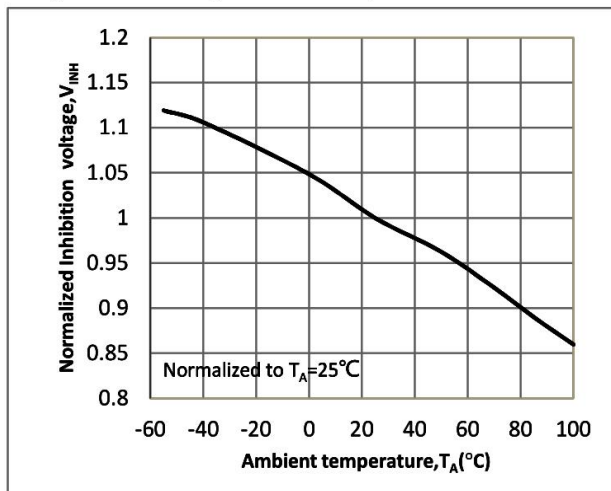
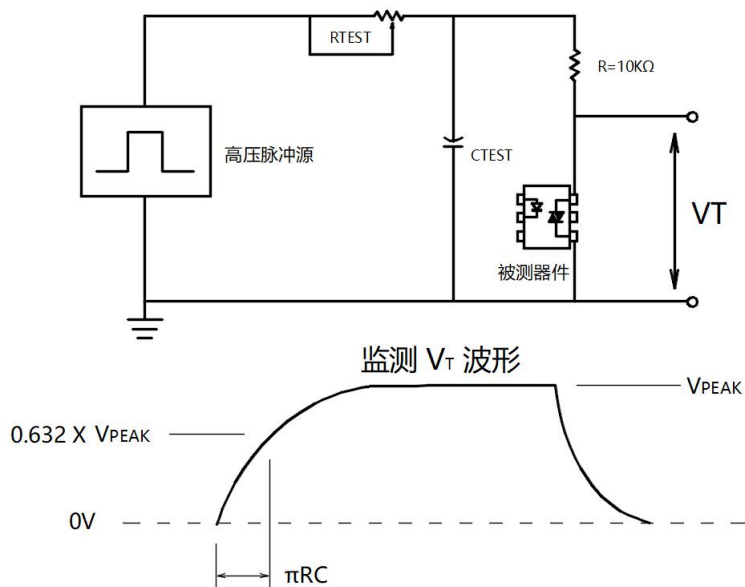


Fig.9 Static dv/dt test circuit and waveform



The high voltage pulse applied to the output of the device under test through the RC circuit is set to the required V<sub>PEAK</sub> value. LED current is not applied. The waveform V<sub>T</sub> is monitored with X100 probe.

By adjusting the R<sub>TEST</sub> value, the dv/dt (slope) increases until the device under test is observed to be triggered (waveform collapse). Then dv/dt drops until the device under test stops being triggered. At this point, RC is recorded and the dv/dt calculated.

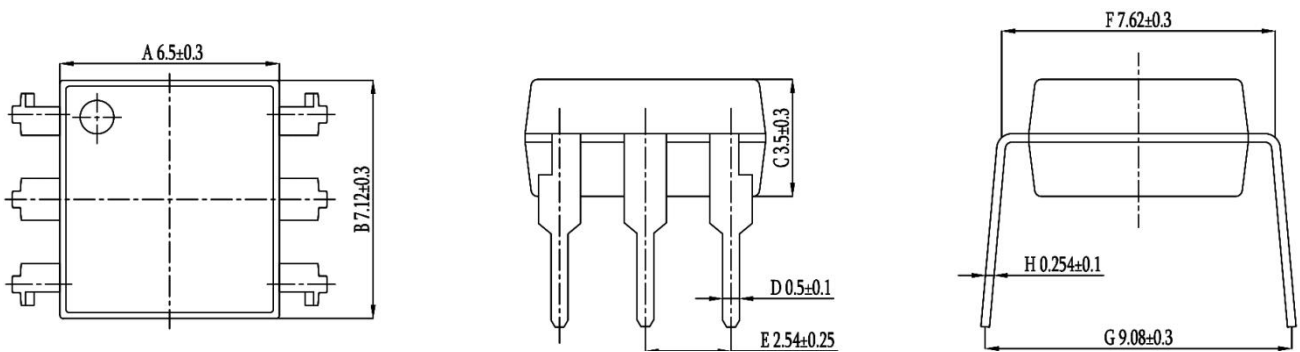
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, V<sub>PEAK</sub> = 400V for BL52X series. The dv/dt value is calculated as follows:

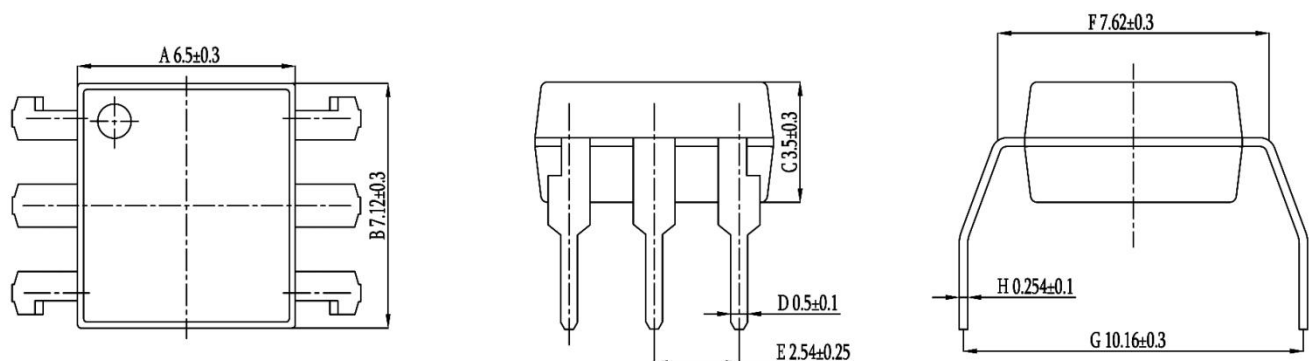
$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

### Package Outline Dimensions (unit: mm)

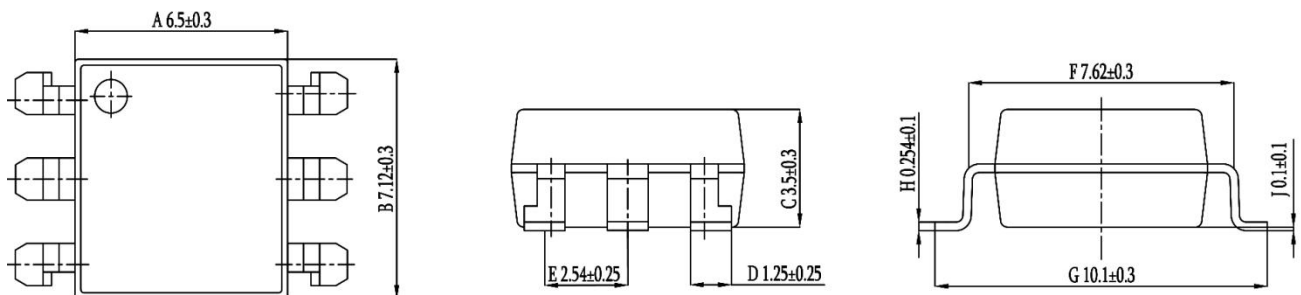
#### DIP6



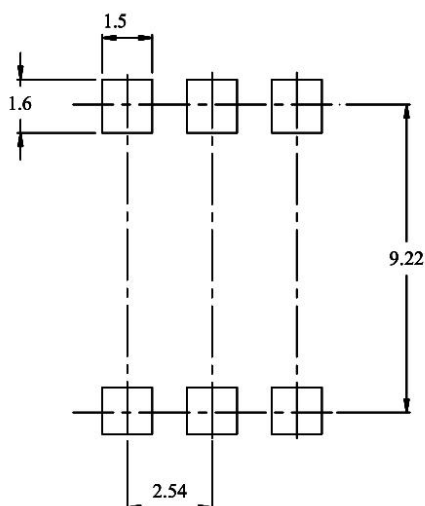
#### DIP6-M



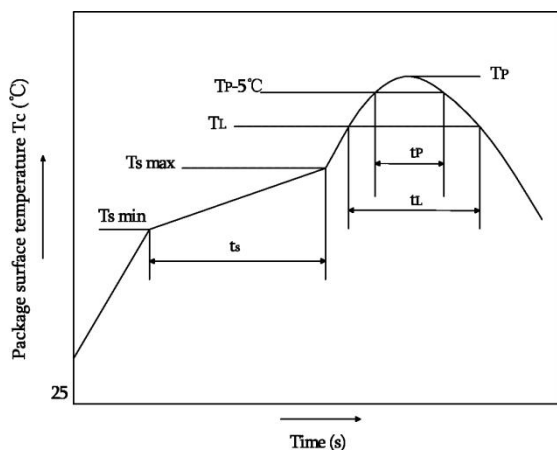
#### SMD6



### SOLDERING FOOTPRINT (unit: mm)



## Reflow soldering

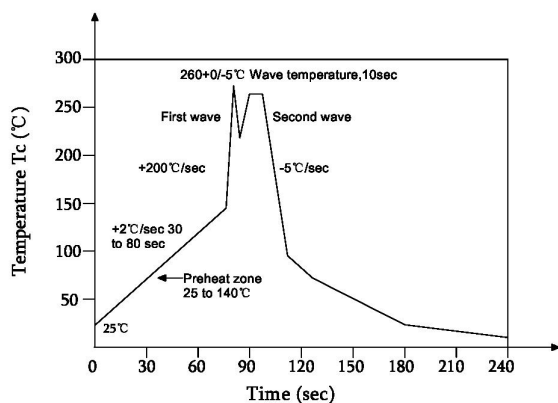


|                                                          | Symbol | Min | Max | Unit                 |
|----------------------------------------------------------|--------|-----|-----|----------------------|
| Preheat temperayure                                      | $T_s$  | 150 | 200 | $^{\circ}\text{C}$   |
| Preheat time                                             | $t_s$  | 60  | 120 | s                    |
| Ramp-up rate( $T_L$ to $T_P$ )                           | -      | -   | 3   | $^{\circ}\text{C/s}$ |
| Liquidus temperature                                     | $T_L$  | 217 |     | $^{\circ}\text{C}$   |
| Time above $T_L$                                         | $t_L$  | 60  | 150 | s                    |
| Peak temperature                                         | $T_P$  |     | 260 | $^{\circ}\text{C}$   |
| Time during which $T_c$ is between ( $T_P-5$ ) and $T_P$ | $t_p$  | -   | 30  | s                    |
| Ramp-down rate( $T_P$ to $T_L$ )                         | -      | -   | 6   | $^{\circ}\text{C/s}$ |

**Note:**

Reflow soldering is recommended at the temperatures and times shown, no more than three times.

## Wave soldering



| Profile feature                    |                                             |
|------------------------------------|---------------------------------------------|
| Average ramp-up rate               | ~200°C/s                                    |
| Heating rate during preheat        | 1°C/s to 2°C/s<br>typical; 4°C/s<br>maximum |
| Final preheat temperature $T_s$    | ~130°C                                      |
| Preheat time (25°C to $T_s$ )      | >60s                                        |
| Peak temperature $T_p$             | 260°C                                       |
| Time within peak temperature $t_p$ | 10s                                         |
| Ramp-down rate                     | 5°C/s maximum                               |

## Soldering with hand soldering iron

- A. Hand soldering iron is only used for product rework or sample testing.
- B. Hand soldering iron requirements: Temperature:  $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$  within 3s.



### Packing

| Package Type | Packing Form | Quantity per Tube & Reel | Quantity per Box | Quantity per Carton | Antistatic Bag Specification | Box Specification | Carton Specification | Note                               |
|--------------|--------------|--------------------------|------------------|---------------------|------------------------------|-------------------|----------------------|------------------------------------|
| DIP6         | Tube(500mm)  | 65 pcs/tube              | 25 tubes /box    | 12 boxes /ctn       | 190*670mm                    | 520*105*50mm      | 545*372*235mm        | Straight insert type material tube |
| DIP6-M       | Tube(500mm)  | 65 pcs/tube              | 25 tubes /box    | 12 boxes /ctn       | 190*670mm                    | 520*105*50mm      | 545*372*235mm        | Seagull foot (M foot) tube         |
| SMD6         | Reel(φ330mm) | 1000 pcs/reel            | 2 reels /box     | 5 boxes /ctn        | 380*420mm                    | 350*340*60mm      | 365*330*370mm        | Guard band 200mm /min.             |

#### ■ Summary table

##### ■ DIP6/DIP6-M (Tube)

Qty/ tube : 65pcs. Qty/box: 1625pcs.

Qty/ctn : 19500pcs.

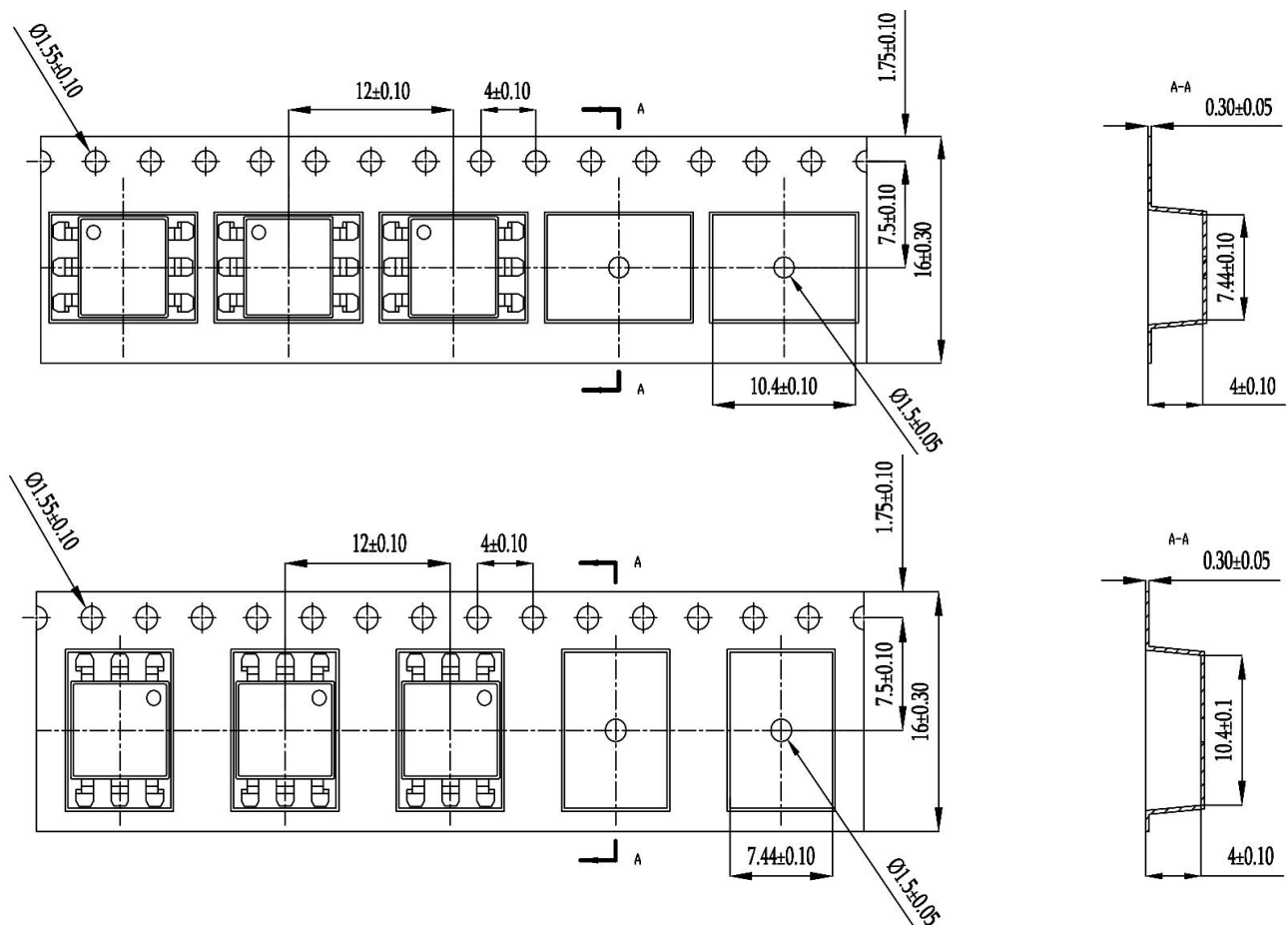
Schematic: (unit:mm)

##### ■ SMD6 (Reel)

Qty/reel: 1000pcs. Qty/box: 2000pcs.

Qty/ctn : 10000pcs.

Schematic: (unit:mm)



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