# AiP74LVC1G240
# Single Buffer/Driver with 3-state output

# Product Specification

**Specification Revision History：**

| Version | Date | Description |
|---|---|---|
| 2023-05-A1 | 2023-05 | New |
| | | |
| | | |
| | | |
| | | |
| | | |

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## 1、General Description

The AiP74LVC1G240 is a single line driver with a 3-state output.
The input can be driven from either 3.3V or 5V devices. This feature allows the use of this device in a mixed 3.3V and 5V environment.

**Features:**

- Wide supply voltage range from 1.65V to 5.5V
- Inputs accept voltages to 5.5 V
- ±24mA output drive at 3.0V
- High-impedance when $V_{CC}$=0V
- Temperature range:-40℃ to +125℃
- Packaging information: SOT23-5/SOT353/XSON6

**Ordering Information:**

**Reel packing specifications:**

| Part number | Packaging form | Marking code | Reel quantity | Boxed reel quantity | Notes |
|---|---|---|---|---|---|
| AiP74LVC1G240GB235.TR | SOT23-5 | EBXX | 3000 PCS/reel | 30000 PCS/box | Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing: 0.95mm |
| AiP74LVC1G240GC353.TR | SOT353 | EBXX | 3000 PCS/reel | 30000 PCS/box | Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing: 0.65mm |
| AiP74LVC1G240EA6.TR | XSON6 | EBXX | 5000 PCS/reel | 25000 PCS/box | Dimensions of plastic enclosure: 1.45mm×1.0mm Pin spacing: 0.5mm |

Note 1: "XX" refers to variable content, meaning year and package batch serial number.
Note 2: If the physical information is inconsistent with the ordering information, please refer to the actual product.

## 2、Block Diagram And Pin Description

### 2.1、Block Diagram

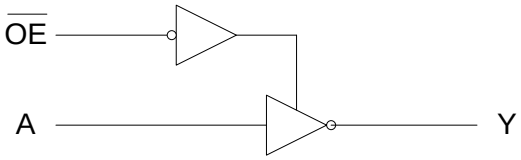
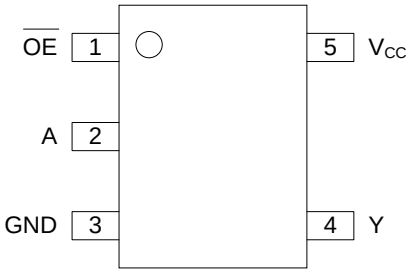
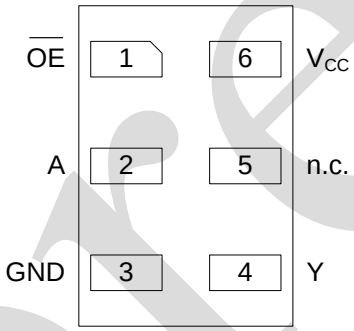



Figure 1. Logic diagram

### 2.2、Pin Configurations




SOT23-5/SOT353




XSON6

### 2.3、Pin Description

| Pin No. | | Pin Name | Description |
|---|---|---|---|
| SOT23-5/SOT353 | XSON6 | | |
| 1 | 1 | $\overline{OE}$ | enable input |
| 2 | 2 | A | data input |
| 3 | 3 | GND | ground (0V) |
| 4 | 4 | Y | data output |
| 5 | 6 | $V_{CC}$ | supply voltage |
| - | 5 | n.c. | not connected |

### 2.4、Function Table

| Input | | Output |
|---|---|---|
| $\overline{OE}$ | A | Y |
| L | H | L |
| L | L | H |
| H | X | Z |

Note: H=HIGH voltage level; L=LOW voltage level.

## 3、Electrical Parameter

### 3.1、Absolute Maximum Ratings

(Voltages are referenced to GND (ground = 0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | Min. | Max. | Unit |
|---|---|---|---|---|---|
| supply voltage | $V_{CC}$ | - | -0.5 | +6.5 | V |
| input voltage | $V_I$ | - | -0.5 | +6.5 | V |
| output voltage | $V_O$ | Active mode | -0.5 | $V_{CC}$+0.5 | V |
| | | Power-down mode; $V_{CC}$=0V | -0.5 | +6.5 | V |
| | | output 3-state | -0.5 | +6.5 | V |
| supply current | $I_{CC}$ | - | - | 100 | mA |
| ground current | $I_{GND}$ | - | -100 | - | mA |
| input clamping current | $I_{IK}$ | $V_I$ < 0V | -50 | - | mA |
| output current | $I_O$ | $V_O$=0V to $V_{CC}$ | - | ±50 | mA |
| output clamping current | $I_{OK}$ | $V_O$ > $V_{CC}$ or $V_O$ < 0V | - | ±50 | mA |
| storage temperature | $T_{stg}$ | - | -65 | +150 | ℃ |
| soldering temperature | $T_L$ | 10s | 260 | | ℃ |

### 3.2、Recommended Operating Conditions

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| supply voltage | $V_{CC}$ | - | 1.65 | - | 5.5 | V |
| input voltage | $V_I$ | - | 0 | - | 5.5 | V |
| output voltage | $V_O$ | Active mode | 0 | - | $V_{CC}$ | V |
| | | Power-down mode; $V_{CC}$=0V | 0 | - | 5.5 | V |
| | | output 3-state | 0 | - | 5.5 | V |
| ambient temperature | $T_{amb}$ | - | -40 | - | +125 | ℃ |

### 3.3、Electrical Characteristics

#### 3.3.1、DC Characteristics 1

($T_{amb}$=-40℃ to +85℃, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| HIGH-level input voltage | $V_{IH}$ | $V_{CC}$=1.65V to 1.95V | | 0.65×$V_{CC}$ | - | - | V |
| | | $V_{CC}$=2.3V to 2.7V | | 1.7 | - | - | V |
| | | $V_{CC}$=2.7V to 3.6V | | 2.0 | - | - | V |
| | | $V_{CC}$=4.5V to 5.5V | | 0.7×$V_{CC}$ | - | - | V |
| LOW-level input voltage | $V_{IL}$ | $V_{CC}$=1.65V to 1.95V | | - | - | 0.35×$V_{CC}$ | V |
| | | $V_{CC}$=2.3V to 2.7V | | - | - | 0.7 | V |
| | | $V_{CC}$=2.7V to 3.6V | | - | - | 0.8 | V |
| | | $V_{CC}$=4.5V to 5.5V | | - | - | 0.3×$V_{CC}$ | V |
| HIGH-level output voltage | $V_{OH}$ | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=-100uA; $V_{CC}$=1.65V to 5.5V | $V_{CC}$ - 0.1 | - | - | V |
| | | | $I_O$=-4mA; $V_{CC}$=1.65V | 1.2 | 1.54 | - | V |
| | | | $I_O$=-8mA; $V_{CC}$=2.3V | 1.9 | 2.15 | - | V |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | $I_O$=-12mA; $V_{CC}$=2.7V | 2.2 | 2.50 | - | V |
| | | | $I_O$=-24mA; $V_{CC}$=3.0V | 2.3 | 2.62 | - | V |
| | | | $I_O$=-32mA; $V_{CC}$=4.5V | 3.8 | 4.11 | - | V |
| LOW-level output voltage | $V_{OL}$ | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=100uA; $V_{CC}$=1.65V to 5.5V | - | - | 0.10 | V |
| | | | $I_O$=4mA; $V_{CC}$=1.65V | - | 0.07 | 0.45 | V |
| | | | $I_O$=8mA; $V_{CC}$=2.3V | - | 0.12 | 0.30 | V |
| | | | $I_O$=12mA; $V_{CC}$=2.7V | - | 0.17 | 0.40 | V |
| | | | $I_O$=24mA; $V_{CC}$=3.0V | - | 0.33 | 0.55 | V |
| | | | $I_O$=32mA; $V_{CC}$=4.5V | - | 0.39 | 0.55 | V |
| input leakage current | $I_I$ | $V_I$=5.5V or GND; $V_{CC}$=0V to 5.5V | | - | - | ±1 | uA |
| OFF-state output current | $I_{OZ}$ | $V_I$=$V_{IH}$ or $V_{IL}$; $V_O$=5.5V or GND; $V_{CC}$=3.6V | | - | - | ±2 | uA |
| power-off leakage current | $I_{OFF}$ | $V_I$ or $V_O$=5.5V; $V_{CC}$=0V | | - | - | ±2 | uA |
| supply current | $I_{CC}$ | $V_I$=5.5V or GND; $I_O$=0A; $V_{CC}$=1.65V to 5.5V | | - | - | 4 | uA |
| additional supply current | $\Delta I_{CC}$ | $V_I$=$V_{CC}$-0.6V; $I_O$=0A; $V_{CC}$=2.3V to 5.5V | | - | - | 500 | uA |

Note: Typical values are measured at $T_{amb}$=25℃.

### 3.3.2、DC Characteristics 2

($T_{amb}$=-40℃ to +125℃, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| HIGH-level input voltage | $V_{IH}$ | $V_{CC}$=1.65V to 1.95V | | 0.65× $V_{CC}$ | - | - | V |
| | | $V_{CC}$=2.3V to 2.7V | | 1.7 | - | - | V |
| | | $V_{CC}$=2.7V to 3.6V | | 2.0 | - | - | V |
| | | $V_{CC}$=4.5V to 5.5V | | 0.7× $V_{CC}$ | - | - | V |
| LOW-level input voltage | $V_{IL}$ | $V_{CC}$=1.65V to 1.95V | | - | - | 0.35× $V_{CC}$ | V |
| | | $V_{CC}$=2.3V to 2.7V | | - | - | 0.7 | V |
| | | $V_{CC}$=2.7V to 3.6V | | - | - | 0.8 | V |
| | | $V_{CC}$=4.5V to 5.5V | | - | - | 0.3× $V_{CC}$ | V |
| HIGH-level output voltage | $V_{OH}$ | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=-100uA; $V_{CC}$=1.65V to 5.5V | $V_{CC}$ - 0.1 | - | - | V |
| | | | $I_O$=-4mA; $V_{CC}$=1.65V | 0.95 | - | - | V |
| | | | $I_O$=-8mA; $V_{CC}$=2.3V | 1.7 | - | - | V |
| | | | $I_O$=-12mA; $V_{CC}$=2.7V | 1.9 | - | - | V |
| | | | $I_O$=-24mA; $V_{CC}$=3.0V | 2.0 | - | - | V |
| | | | $I_O$=-32mA; $V_{CC}$=4.5V | 3.4 | - | - | V |
| LOW-level output voltage | $V_{OL}$ | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=100uA; $V_{CC}$=1.65V to 5.5V | - | - | 0.10 | V |
| | | | $I_O$=4mA; $V_{CC}$=1.65V | - | - | 0.70 | V |
| | | | $I_O$=8mA; $V_{CC}$=2.3V | - | - | 0.45 | V |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | $I_O$=12mA; $V_{CC}$=2.7V | - | - | 0.60 | V |
| | | | $I_O$=24mA; $V_{CC}$=3.0V | - | - | 0.80 | V |
| | | | $I_O$=32mA; $V_{CC}$=4.5V | - | - | 0.80 | V |
| input leakage current | $I_I$ | $V_I$=5.5V or GND; $V_{CC}$=0V to 5.5V | | - | - | ±1 | uA |
| OFF-state output current | $I_{OZ}$ | $V_I$=$V_{IH}$ or $V_{IL}$; $V_O$=5.5V or GND; $V_{CC}$=3.6V | | - | - | ±2 | uA |
| power-off leakage current | $I_{OFF}$ | $V_I$ or $V_O$=5.5V; $V_{CC}$=0V | | - | - | ±2 | uA |
| supply current | $I_{CC}$ | $V_I$=5.5V or GND; $I_O$=0A; $V_{CC}$=1.65V to 5.5V | | - | - | 4 | uA |
| additional supply current | $\Delta I_{CC}$ | $V_I$=$V_{CC}$-0.6V; $I_O$=0A; $V_{CC}$=2.3V to 5.5V | | - | - | 500 | uA |

### 3.3.3、AC Characteristics 1

($T_{amb}$=-40℃ to +85℃, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| A to Y propagation delay | $t_{PLH}$, $t_{PHL}$ | see Figure 4 | $V_{CC}$=1.65V to 1.95V | 3 | - | 8.6 | ns |
| | | | $V_{CC}$=2.3V to 2.7V | 1.4 | - | 5.5 | ns |
| | | | $V_{CC}$=3.0V to 3.6V | 1.1 | - | 4.5 | ns |
| | | | $V_{CC}$=4.5V to 5.5V | 1 | - | 4 | ns |
| $\overline{OE}$ to A/B enable time | $t_{PZH}$, $t_{PZL}$ | see Figure 5 | $V_{CC}$=1.65V to 1.95V | 3.8 | - | 10 | ns |
| | | | $V_{CC}$=2.3V to 2.7V | 2.1 | - | 6.5 | ns |
| | | | $V_{CC}$=3.0V to 3.6V | 1.4 | - | 5.4 | ns |
| | | | $V_{CC}$=4.5V to 5.5V | 1.1 | - | 5.2 | ns |
| $\overline{OE}$ to A/B disable time | $t_{PLZ}$, $t_{PHZ}$ | see Figure 5 | $V_{CC}$=1.65V to 1.95V | 2.1 | - | 9.4 | ns |
| | | | $V_{CC}$=2.3V to 2.7V | 1 | - | 4.9 | ns |
| | | | $V_{CC}$=3.0V to 3.6V | 1.4 | - | 5.2 | ns |
| | | | $V_{CC}$=4.5V to 5.5V | 1 | - | 4.1 | ns |

Note: Typical values are measured at $T_{amb}$=25℃ and $V_{CC}$=1.8V, 2.5V, 2.7V, 3.3V and 5.0V respectively.

### 3.3.4、AC Characteristics 2

($T_{amb}$=-40℃ to +125℃, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| A to Y propagation delay | $t_{PLH}$, $t_{PHL}$ | see Figure 4 | $V_{CC}$=1.65V to 1.95V | - | - | 9.6 | ns |
| | | | $V_{CC}$=2.3V to 2.7V | - | - | 5.7 | ns |
| | | | $V_{CC}$=3.0V to 3.6V | - | - | 4.7 | ns |
| | | | $V_{CC}$=4.5V to 5.5V | - | - | 4.2 | ns |
| $\overline{OE}$ to A/B enable time | $t_{PZH}$, $t_{PZL}$ | see Figure 5 | $V_{CC}$=1.65V to 1.95V | - | - | 10.2 | ns |
| | | | $V_{CC}$=2.3V to 2.7V | - | - | 6.7 | ns |
| | | | $V_{CC}$=3.0V to 3.6V | - | - | 5.6 | ns |
| | | | $V_{CC}$=4.5V to 5.5V | - | - | 5.4 | ns |
| $\overline{OE}$ to A/B disable time | $t_{PLZ}$, $t_{PHZ}$ | see Figure 5 | $V_{CC}$=1.65V to 1.95V | - | - | 9.6 | ns |
| | | | $V_{CC}$=2.3V to 2.7V | - | - | 5.1 | ns |
| | | | $V_{CC}$=3.0V to 3.6V | - | - | 5.4 | ns |
| | | | $V_{CC}$=4.5V to 5.5V | - | - | 4.3 | ns |

## 4、Testing Circuit

### 4.1、AC Testing Circuit

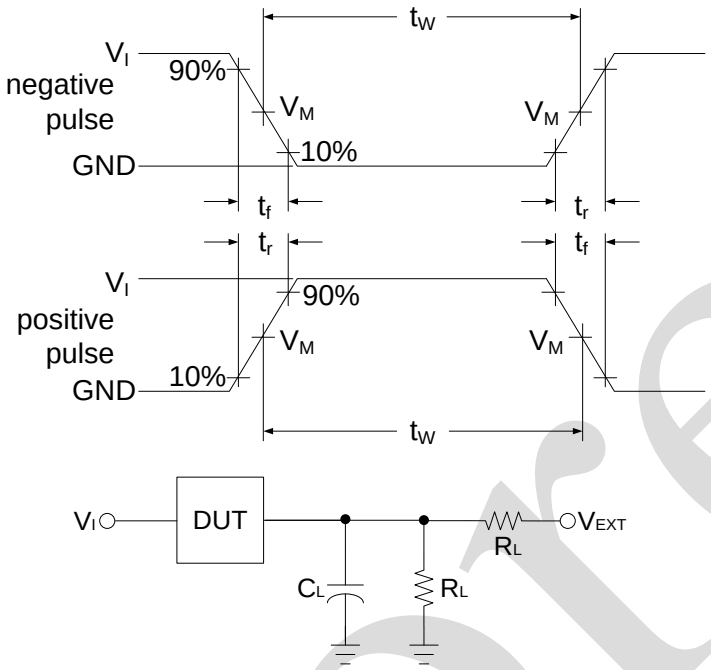



Figure 3. Load circuit

$C_L$ includes probe and jig capacitance.

$R_L$=Load resistance.

### 4.2、Test Data

| Supply voltage | Input | | Load | | $V_{EXT}$ | | |
|---|---|---|---|---|---|---|---|
| $V_{CC}$ | $V_I$ | $t_r = t_f$ | $C_L$ | $R_L$ | $t_{PLH}/t_{PHL}$ | $t_{PLZ}/t_{PZL}$ | $t_{PHZ}/t_{PZH}$ |
| 1.65V to 1.95V | $V_{CC}$ | ≤ 3ns | 30pF | 1kΩ | Open | 2×$V_{CC}$ | GND |
| 2.3V to 2.7V | $V_{CC}$ | ≤ 3ns | 30pF | 500Ω | Open | 2×$V_{CC}$ | GND |
| 2.7V | $V_{CC}$ | ≤ 3ns | 50pF | 500Ω | Open | 2×$V_{CC}$ | GND |
| 3.0V to 3.6V | $V_{CC}$ | ≤ 3ns | 50pF | 500Ω | Open | 2×$V_{CC}$ | GND |
| 4.5V to 5.5V | $V_{CC}$ | ≤ 3ns | 50pF | 500Ω | Open | 2×$V_{CC}$ | GND |

### 4.3、AC Testing Waveforms

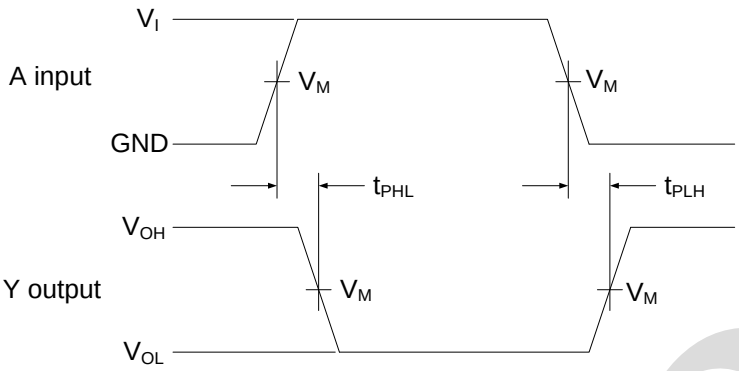



Figure 4. The data input (A) to output (Y) propagation delays

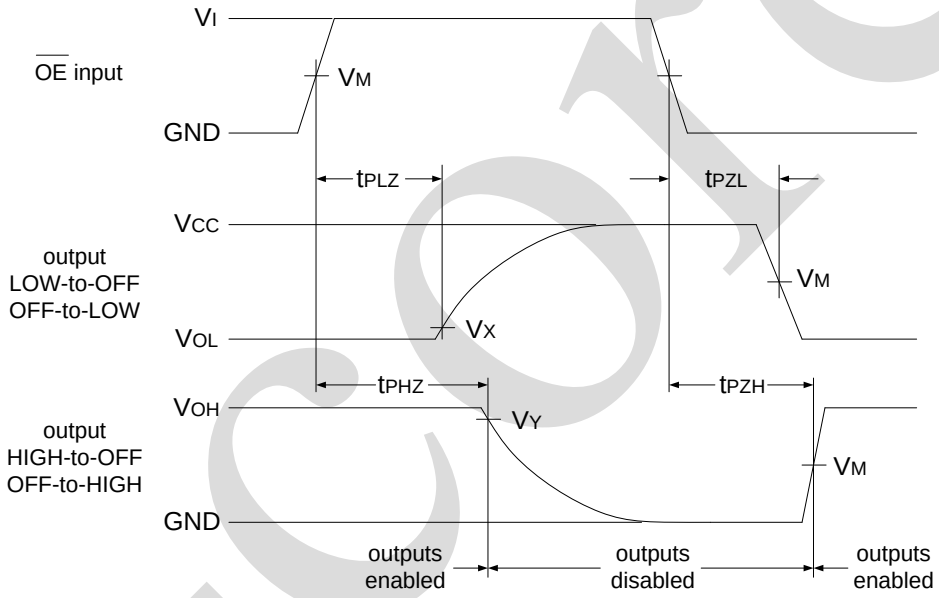


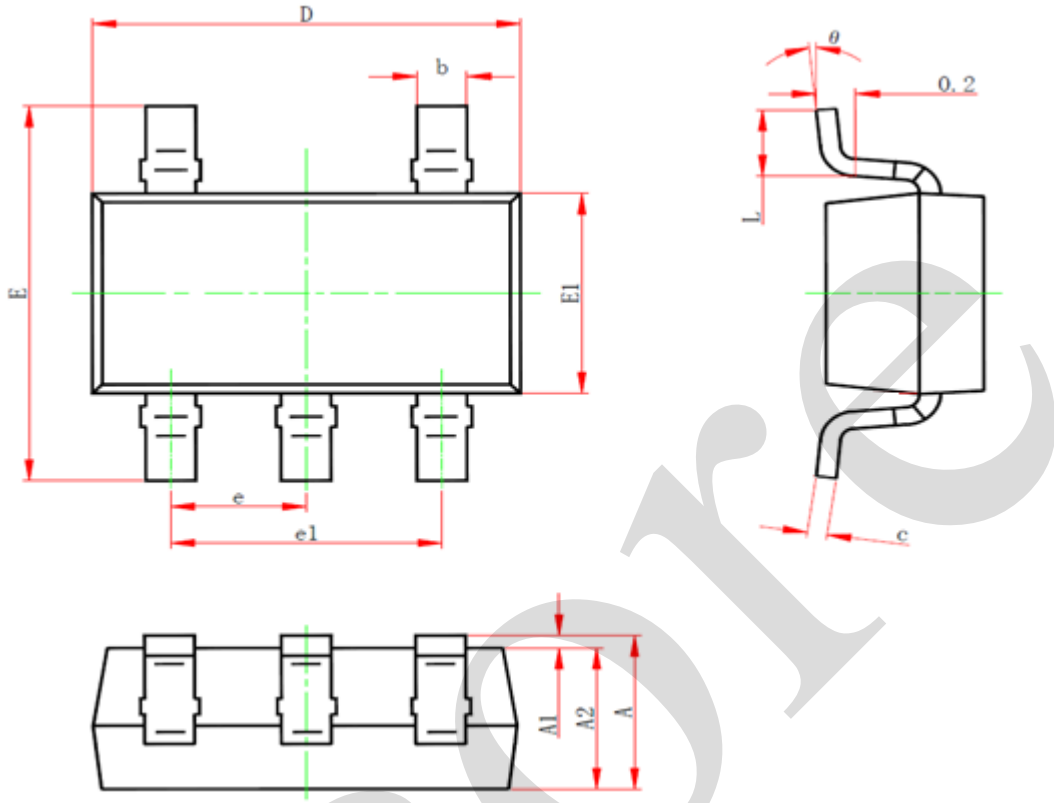

Figure 5. 3-state enable and disable times

### 4.4、Measurement Points

| Supply voltage | Input | Output | | |
|---|---|---|---|---|
| $V_{CC}$ | $V_M$ | $V_M$ | $V_X$ | $V_Y$ |
| 1.65V～1.95V | $0.5\times V_{CC}$ | $0.5\times V_{CC}$ | $V_{OL}$+0.15V | $V_{OH}$-0.15V |
| 2.3V～2.7V | $0.5\times V_{CC}$ | $0.5\times V_{CC}$ | $V_{OL}$+0.15V | $V_{OH}$-0.15V |
| 3.0V～3.6V | $0.5\times V_{CC}$ | $0.5\times V_{CC}$ | $V_{OL}$+0.3V | $V_{OH}$-0.3V |
| 4.5V～5.5V | $0.5\times V_{CC}$ | $0.5\times V_{CC}$ | $V_{OL}$+0.3V | $V_{OH}$-0.3V |

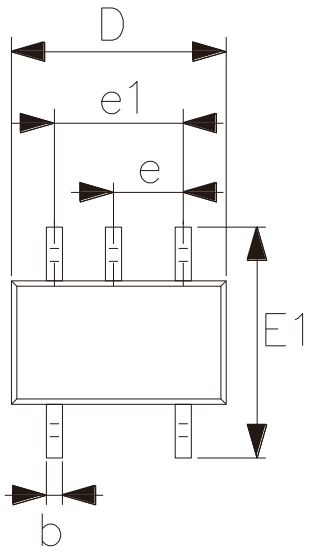
## 5、Package Information

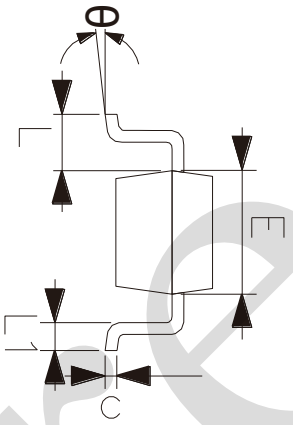
### 5.1、SOT23-5

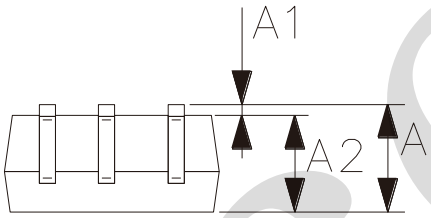



| Symbol | Dimensions (mm) | |
|---|---|---|
| | Min. | Max. |
| A | - | 1.26 |
| A1 | 0.00 | 0.12 |
| A2 | 1.00 | 1.20 |
| b | 0.30 | 0.50 |
| c | 0.10 | 0.20 |
| D | 2.82 | 3.02 |
| E | 2.60 | 3.00 |
| E1 | 1.50 | 1.70 |
| e | 0.95 | |
| e1 | 1.80 | 2.00 |
| L | 0.30 | 0.60 |
| θ | 0° | 8° |

**5.2、SOT353**

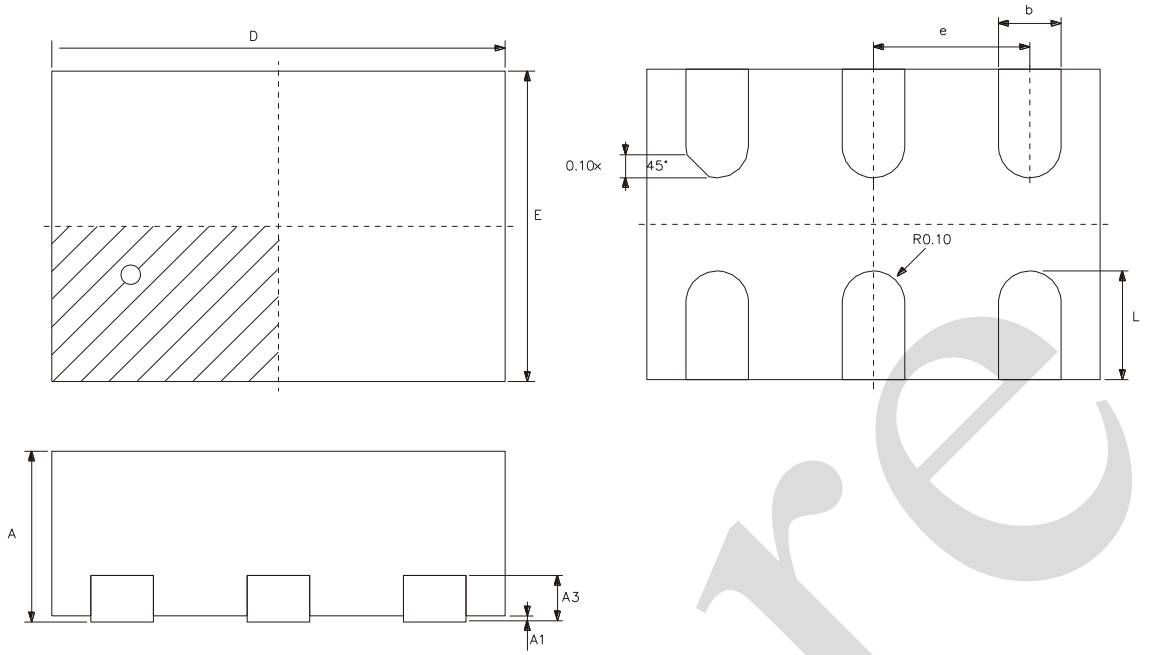



| Symbol | Dimensions (mm) | |
|---|---|---|
| | Min. | Max. |
| A | 0.90 | 1.10 |
| A1 | 0.00 | 0.10 |
| A2 | 0.90 | 1.00 |
| b | 0.15 | 0.35 |
| c | 0.11 | 0.175 |
| D | 2.00 | 2.20 |
| E | 1.15 | 1.35 |
| E1 | 2.15 | 2.45 |
| e | 0.65 | |
| e1 | 1.20 | 1.40 |
| L | 0.525 | |
| L1 | 0.26 | 0.46 |
| θ | 0 ° | 8 ° |

**5.3、XSON6**




| Symbol | Dimensions (mm) | |
|---|---|---|
| | Min. | Max. |
| A | 0.51 | 0.60 |
| A1 | 0.00 | 0.05 |
| A3 | 0.15 | |
| b | 0.15 | 0.25 |
| D | 1.45 | |
| E | 1.00 | |
| e | 0.50 | |
| L | 0.25 | 0.45 |

## 6、Statements And Notes

### 6.1、The name and content of Hazardous substances or Elements in the product

| Part name | Hazardous substances or Elements | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Lead and lead compounds | Mercury and mercury compounds | Cadmium and cadmium compounds | Hexavalent chromium compounds | Polybrominated biphenyls | Polybrominated biphenyl ethers | Dibutyl phthalate | Butylbenzyl phthalate | Di-2-ethylhexyl phthalate | Diisobutyl phthalate |
| Lead frame | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Plastic resin | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Chip | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The lead | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Plastic sheet installed | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| explanation | ○：Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard.<br>×：Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements. | | | | | | | | | |

### 6.2、Notes

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