



# **AiP74AUP2G32**

## **Low Power Dual 2-input Or Gate**

### **Product Specification**

#### **Specification Revision History:**

| <b>Version</b> | <b>Date</b> | <b>Description</b> |
|----------------|-------------|--------------------|
| 2022-11-A1     | 2022-11     | New                |
|                |             |                    |
|                |             |                    |
|                |             |                    |



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## 1、General Description

The AiP74AUP2G32 provides dual 2-input OR function. This device ensures a very low static and dynamic power consumption across the entire  $V_{CC}$  range from 0.8V to 3.6V.

### Features:

- Wide supply voltage range from 0.8V to 3.6V
- Low static power consumption;  $I_{CC}=1.0\mu A$  (maximum)
- Inputs accept voltages up to 3.6V
- Specified from  $-40^{\circ}C$  to  $+125^{\circ}C$
- Packaging information: TSSOP8/VSSOP8

### Ordering Information:

#### Reel packing specifications:

| Part number        | Packaging form | Marking code | Reel quantity | Boxed reel quantity | Notes                                                              |
|--------------------|----------------|--------------|---------------|---------------------|--------------------------------------------------------------------|
| AiP74AUP2G32TA8.TR | TSSOP8         | DXXX         | 3000 PCS/reel | 3000 PCS/box        | Dimensions of plastic enclosure: 3.0mm×3.0mm<br>Pin spacing:0.65mm |
| AiP74AUP2G32YA8.TR | VSSOP8         | DXXX         | 3000 PCS/reel | 3000 PCS/box        | Dimensions of plastic enclosure: 2.0mm×2.3mm<br>Pin spacing:0.50mm |

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

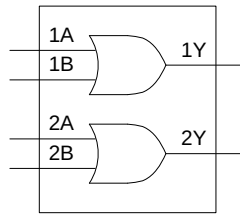


Figure 1. Logic symbol

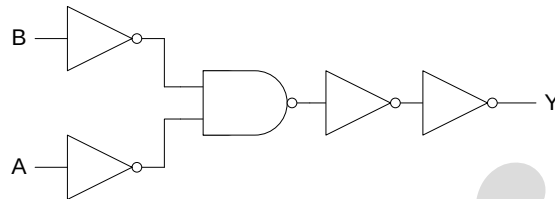
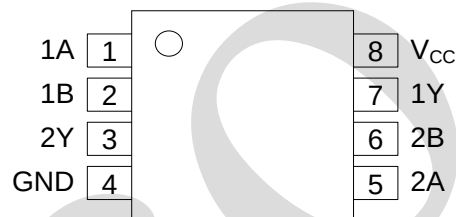


Figure 2. Logic diagram (one Schmitt trigger)

### 2.2、Pin Configurations





## 2.3、Pin Description

| Pin No. | Pin Name        | Description    |
|---------|-----------------|----------------|
| 1       | 1A              | data input     |
| 2       | 1B              | data input     |
| 3       | 2Y              | data output    |
| 4       | GND             | ground (0V)    |
| 5       | 2A              | data input     |
| 6       | 2B              | data input     |
| 7       | 1Y              | data output    |
| 8       | V <sub>CC</sub> | supply voltage |

## 2.4、Function Table

| Input |    | Output |
|-------|----|--------|
| nA    | nB | nY     |
| L     | L  | L      |
| L     | H  | H      |
| H     | L  | H      |
| H     | H  | H      |

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

## 3、Electrical Parameter

### 3.1、Absolute Maximum Ratings

(T<sub>amb</sub>=25℃, all voltage referenced to GND, unless otherwise specified)

| Parameter               | Symbol           | Conditions                            | Min. | Max. | Unit |
|-------------------------|------------------|---------------------------------------|------|------|------|
| supply voltage          | V <sub>CC</sub>  | -                                     | -0.5 | +4.6 | V    |
| input clamping current  | I <sub>IK</sub>  | V <sub>I</sub> <0V                    | -50  | -    | mA   |
| input voltage           | V <sub>I</sub>   | -                                     | -0.5 | +4.6 | V    |
| output clamping current | I <sub>OK</sub>  | V <sub>O</sub> <0V                    | -50  | -    | mA   |
| output voltage          | V <sub>O</sub>   | Active mode and Power-down mode       | -0.5 | +4.6 | V    |
| output current          | I <sub>O</sub>   | V <sub>O</sub> =0V to V <sub>CC</sub> | -    | ±20  | mA   |
| supply current          | I <sub>CC</sub>  | -                                     | -    | +50  | mA   |
| ground current          | I <sub>GND</sub> | -                                     | -50  | -    | mA   |
| storage temperature     | T <sub>stg</sub> | -                                     | -65  | +150 | ℃    |
| total power dissipation | P <sub>tot</sub> | -                                     | -    | 250  | mW   |
| soldering temperature   | T <sub>L</sub>   | 10s                                   | 260  |      | ℃    |



## 3.2、Recommended Operating Conditions

| Parameter           | Symbol    | Conditions                   | Min. | Typ. | Max.     | Unit |
|---------------------|-----------|------------------------------|------|------|----------|------|
| supply voltage      | $V_{CC}$  | -                            | 0.8  | -    | 3.6      | V    |
| input voltage       | $V_I$     | -                            | 0    | -    | 3.6      | V    |
| output voltage      | $V_O$     | Active mode                  | 0    | -    | $V_{CC}$ | V    |
|                     |           | Power-down mode; $V_{CC}=0V$ | 0    | -    | 3.6      | V    |
| ambient temperature | $T_{amb}$ | -                            | -40  | -    | +125     | °C   |

## 3.3、Electrical Characteristics

### 3.3.1、DC Characteristics 1

( $T_{amb}=25^{\circ}C$ , voltages are referenced to GND (ground=0V), unless otherwise specified)

| Parameter                 | Symbol   | Conditions                                     |                                             | Min.                 | Typ. | Max.                 | Unit    |
|---------------------------|----------|------------------------------------------------|---------------------------------------------|----------------------|------|----------------------|---------|
| HIGH-level input voltage  | $V_{IH}$ | $V_{CC}=0.8V$                                  |                                             | $0.70 \times V_{CC}$ | -    | -                    | V       |
|                           |          | $V_{CC}=0.9V$ to $1.95V$                       |                                             | $0.65 \times V_{CC}$ | -    | -                    | V       |
|                           |          | $V_{CC}=2.3V$ to $2.7V$                        |                                             | 1.6                  | -    | -                    | V       |
|                           |          | $V_{CC}=3.0V$ to $3.6V$                        |                                             | 2.0                  | -    | -                    | V       |
| LOW-level input voltage   | $V_{IL}$ | $V_{CC}=0.8V$                                  |                                             | -                    | -    | $0.30 \times V_{CC}$ | V       |
|                           |          | $V_{CC}=0.9V$ to $1.95V$                       |                                             | -                    | -    | $0.35 \times V_{CC}$ | V       |
|                           |          | $V_{CC}=2.3V$ to $2.7V$                        |                                             | -                    | -    | 0.7                  | V       |
|                           |          | $V_{CC}=3.0V$ to $3.6V$                        |                                             | -                    | -    | 0.9                  | V       |
| HIGH-level output voltage | $V_{OH}$ | $V_I=V_{IH}$ or $V_{IL}$                       | $I_O=-20\mu A$ ;<br>$V_{CC}=0.8V$ to $3.6V$ | $V_{CC}-0.1$         | -    | -                    | V       |
|                           |          |                                                | $I_O=-1.1mA$ ; $V_{CC}=1.1V$                | $0.75 \times V_{CC}$ | -    | -                    | V       |
|                           |          |                                                | $I_O=-1.7mA$ ; $V_{CC}=1.4V$                | 1.11                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-1.9mA$ ; $V_{CC}=1.65V$               | 1.32                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-2.3mA$ ; $V_{CC}=2.3V$                | 2.05                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-3.1mA$ ; $V_{CC}=2.3V$                | 1.90                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-2.7mA$ ; $V_{CC}=3.0V$                | 2.72                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-4.0mA$ ; $V_{CC}=3.0V$                | 2.60                 | -    | -                    | V       |
| LOW-level output voltage  | $V_{OL}$ | $V_I=V_{IH}$ or $V_{IL}$                       | $I_O=20\mu A$ ;<br>$V_{CC}=0.8V$ to $3.6V$  | -                    | -    | 0.10                 | V       |
|                           |          |                                                | $I_O=1.1mA$ ; $V_{CC}=1.1V$                 | -                    | -    | $0.30 \times V_{CC}$ | V       |
|                           |          |                                                | $I_O=1.7mA$ ; $V_{CC}=1.4V$                 | -                    | -    | 0.31                 | V       |
|                           |          |                                                | $I_O=1.9mA$ ; $V_{CC}=1.65V$                | -                    | -    | 0.31                 | V       |
|                           |          |                                                | $I_O=2.3mA$ ; $V_{CC}=2.3V$                 | -                    | -    | 0.31                 | V       |
|                           |          |                                                | $I_O=3.1mA$ ; $V_{CC}=2.3V$                 | -                    | -    | 0.44                 | V       |
|                           |          |                                                | $I_O=2.7mA$ ; $V_{CC}=3.0V$                 | -                    | -    | 0.31                 | V       |
|                           |          |                                                | $I_O=4.0mA$ ; $V_{CC}=3.0V$                 | -                    | -    | 0.44                 | V       |
| input leakage current     | $I_I$    | $V_I=GND$ to $3.6V$ ;<br>$V_{CC}=0V$ to $3.6V$ |                                             | -                    | -    | $\pm 1$              | $\mu A$ |



|                                      |                  |                                                               |   |   |         |         |
|--------------------------------------|------------------|---------------------------------------------------------------|---|---|---------|---------|
| power-off leakage current            | $I_{OFF}$        | $V_I$ or $V_O=0V$ to $3.6V$ ;<br>$V_{CC}=0V$                  | - | - | $\pm 1$ | $\mu A$ |
| additional power-off leakage current | $\Delta I_{OFF}$ | $V_I$ or $V_O=0V$ to $3.6V$ ;<br>$V_{CC}=0V$ to $0.2V$        | - | - | $\pm 1$ | $\mu A$ |
| supply current                       | $I_{CC}$         | $V_I=GND$ or $V_{CC}$ ; $I_O=0A$ ;<br>$V_{CC}=0.8V$ to $3.6V$ | - | - | 1       | $\mu A$ |
| additional supply current            | $\Delta I_{CC}$  | $V_I=V_{CC}-0.6V$ ; $I_O=0A$ ;<br>$V_{CC}=3.3V$               | - | - | 40      | $\mu A$ |

### 3.3.2、DC Characteristics 2

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

| Parameter                 | Symbol          | Conditions                                                  |                                                         | Min.                     | Typ. | Max.                     | Unit |
|---------------------------|-----------------|-------------------------------------------------------------|---------------------------------------------------------|--------------------------|------|--------------------------|------|
| HIGH-level input voltage  | V <sub>IH</sub> | V <sub>CC</sub> =0.8V                                       |                                                         | 0.70×<br>V <sub>CC</sub> | -    | -                        | V    |
|                           |                 | V <sub>CC</sub> =0.9V to 1.95V                              |                                                         | 0.65×<br>V <sub>CC</sub> | -    | -                        | V    |
|                           |                 | V <sub>CC</sub> =2.3V to 2.7V                               |                                                         | 1.6                      | -    | -                        | V    |
|                           |                 | V <sub>CC</sub> =3.0V to 3.6V                               |                                                         | 2.0                      | -    | -                        | V    |
| LOW-level input voltage   | V <sub>IL</sub> | V <sub>CC</sub> =0.8V                                       |                                                         | -                        | -    | 0.30×<br>V <sub>CC</sub> | V    |
|                           |                 | V <sub>CC</sub> =0.9V to 1.95V                              |                                                         | -                        | -    | 0.35×<br>V <sub>CC</sub> | V    |
|                           |                 | V <sub>CC</sub> =2.3V to 2.7V                               |                                                         | -                        | -    | 0.7                      | V    |
|                           |                 | V <sub>CC</sub> =3.0V to 3.6V                               |                                                         | -                        | -    | 0.9                      | V    |
| HIGH-level output voltage | V <sub>OH</sub> | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>          | I <sub>O</sub> =-20uA;<br>V <sub>CC</sub> =0.8V to 3.6V | V <sub>CC</sub> -<br>0.1 | -    | -                        | V    |
|                           |                 |                                                             | I <sub>O</sub> =-1.1mA; V <sub>CC</sub> =1.1V           | 0.70×<br>V <sub>CC</sub> | -    | -                        | V    |
|                           |                 |                                                             | I <sub>O</sub> =-1.7mA; V <sub>CC</sub> =1.4V           | 1.03                     | -    | -                        | V    |
|                           |                 |                                                             | I <sub>O</sub> =-1.9mA; V <sub>CC</sub> =1.65V          | 1.30                     | -    | -                        | V    |
|                           |                 |                                                             | I <sub>O</sub> =-2.3mA; V <sub>CC</sub> =2.3V           | 1.97                     | -    | -                        | V    |
|                           |                 |                                                             | I <sub>O</sub> =-3.1mA; V <sub>CC</sub> =2.3V           | 1.85                     | -    | -                        | V    |
|                           |                 |                                                             | I <sub>O</sub> =-2.7mA; V <sub>CC</sub> =3.0V           | 2.67                     | -    | -                        | V    |
|                           |                 |                                                             | I <sub>O</sub> =-4.0mA; V <sub>CC</sub> =3.0V           | 2.55                     | -    | -                        | V    |
| LOW-level output voltage  | V <sub>OL</sub> | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>          | I <sub>O</sub> =20uA;<br>V <sub>CC</sub> =0.8V to 3.6V  | -                        | -    | 0.10                     | V    |
|                           |                 |                                                             | I <sub>O</sub> =1.1mA; V <sub>CC</sub> =1.1V            | -                        | -    | 0.30×<br>V <sub>CC</sub> | V    |
|                           |                 |                                                             | I <sub>O</sub> =1.7mA; V <sub>CC</sub> =1.4V            | -                        | -    | 0.37                     | V    |
|                           |                 |                                                             | I <sub>O</sub> =1.9mA; V <sub>CC</sub> =1.65V           | -                        | -    | 0.35                     | V    |
|                           |                 |                                                             | I <sub>O</sub> =2.3mA; V <sub>CC</sub> =2.3V            | -                        | -    | 0.33                     | V    |
|                           |                 |                                                             | I <sub>O</sub> =3.1mA; V <sub>CC</sub> =2.3V            | -                        | -    | 0.45                     | V    |
|                           |                 |                                                             | I <sub>O</sub> =2.7mA; V <sub>CC</sub> =3.0V            | -                        | -    | 0.33                     | V    |
|                           |                 |                                                             | I <sub>O</sub> =4.0mA; V <sub>CC</sub> =3.0V            | -                        | -    | 0.45                     | V    |
| input leakage current     | I <sub>I</sub>  | V <sub>I</sub> =GND to 3.6V;<br>V <sub>CC</sub> =0V to 3.6V |                                                         | -                        | -    | ±2                       | uA   |





|                                      |                  |                                                               |   |   |         |         |
|--------------------------------------|------------------|---------------------------------------------------------------|---|---|---------|---------|
| power-off leakage current            | $I_{OFF}$        | $V_I$ or $V_O=0V$ to $3.6V$ ;<br>$V_{CC}=0V$                  | - | - | $\pm 2$ | $\mu A$ |
| additional power-off leakage current | $\Delta I_{OFF}$ | $V_I$ or $V_O=0V$ to $3.6V$ ;<br>$V_{CC}=0V$ to $0.2V$        | - | - | $\pm 2$ | $\mu A$ |
| supply current                       | $I_{CC}$         | $V_I=GND$ or $V_{CC}$ ; $I_O=0A$ ;<br>$V_{CC}=0.8V$ to $3.6V$ | - | - | 2       | $\mu A$ |
| additional supply current            | $\Delta I_{CC}$  | $V_I=V_{CC}-0.6V$ ; $I_O=0A$ ;<br>$V_{CC}=3.3V$               | - | - | 50      | $\mu A$ |

### 3.3.3、DC Characteristics 3

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

| Parameter                 | Symbol   | Conditions                                     |                                             | Min.                 | Typ. | Max.                 | Unit    |
|---------------------------|----------|------------------------------------------------|---------------------------------------------|----------------------|------|----------------------|---------|
| HIGH-level input voltage  | $V_{IH}$ | $V_{CC}=0.8V$                                  |                                             | $0.75 \times V_{CC}$ | -    | -                    | V       |
|                           |          | $V_{CC}=0.9V$ to $1.95V$                       |                                             | $0.70 \times V_{CC}$ | -    | -                    | V       |
|                           |          | $V_{CC}=2.3V$ to $2.7V$                        |                                             | 1.6                  | -    | -                    | V       |
|                           |          | $V_{CC}=3.0V$ to $3.6V$                        |                                             | 2.0                  | -    | -                    | V       |
| LOW-level input voltage   | $V_{IL}$ | $V_{CC}=0.8V$                                  |                                             | -                    | -    | $0.25 \times V_{CC}$ | V       |
|                           |          | $V_{CC}=0.9V$ to $1.95V$                       |                                             | -                    | -    | $0.30 \times V_{CC}$ | V       |
|                           |          | $V_{CC}=2.3V$ to $2.7V$                        |                                             | -                    | -    | 0.7                  | V       |
|                           |          | $V_{CC}=3.0V$ to $3.6V$                        |                                             | -                    | -    | 0.9                  | V       |
| HIGH-level output voltage | $V_{OH}$ | $V_I=V_{IH}$ or $V_{IL}$                       | $I_O=-20\mu A$ ;<br>$V_{CC}=0.8V$ to $3.6V$ | $V_{CC}-0.11$        | -    | -                    | V       |
|                           |          |                                                | $I_O=-1.1mA$ ; $V_{CC}=1.1V$                | $0.60 \times V_{CC}$ | -    | -                    | V       |
|                           |          |                                                | $I_O=-1.7mA$ ; $V_{CC}=1.4V$                | 0.93                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-1.9mA$ ; $V_{CC}=1.65V$               | 1.17                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-2.3mA$ ; $V_{CC}=2.3V$                | 1.77                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-3.1mA$ ; $V_{CC}=2.3V$                | 1.67                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-2.7mA$ ; $V_{CC}=3.0V$                | 2.40                 | -    | -                    | V       |
|                           |          |                                                | $I_O=-4.0mA$ ; $V_{CC}=3.0V$                | 2.30                 | -    | -                    | V       |
| LOW-level output voltage  | $V_{OL}$ | $V_I=V_{IH}$ or $V_{IL}$                       | $I_O=20\mu A$ ;<br>$V_{CC}=0.8V$ to $3.6V$  | -                    | -    | 0.11                 | V       |
|                           |          |                                                | $I_O=1.1mA$ ; $V_{CC}=1.1V$                 | -                    | -    | $0.33 \times V_{CC}$ | V       |
|                           |          |                                                | $I_O=1.7mA$ ; $V_{CC}=1.4V$                 | -                    | -    | 0.41                 | V       |
|                           |          |                                                | $I_O=1.9mA$ ; $V_{CC}=1.65V$                | -                    | -    | 0.39                 | V       |
|                           |          |                                                | $I_O=2.3mA$ ; $V_{CC}=2.3V$                 | -                    | -    | 0.36                 | V       |
|                           |          |                                                | $I_O=3.1mA$ ; $V_{CC}=2.3V$                 | -                    | -    | 0.50                 | V       |
|                           |          |                                                | $I_O=2.7mA$ ; $V_{CC}=3.0V$                 | -                    | -    | 0.36                 | V       |
|                           |          |                                                | $I_O=4.0mA$ ; $V_{CC}=3.0V$                 | -                    | -    | 0.50                 | V       |
| input leakage current     | $I_I$    | $V_I=GND$ to $3.6V$ ;<br>$V_{CC}=0V$ to $3.6V$ |                                             | -                    | -    | $\pm 4$              | $\mu A$ |



|                                      |                  |                                                               |   |   |         |         |
|--------------------------------------|------------------|---------------------------------------------------------------|---|---|---------|---------|
| power-off leakage current            | $I_{OFF}$        | $V_I$ or $V_O=0V$ to $3.6V$ ;<br>$V_{CC}=0V$                  | - | - | $\pm 4$ | $\mu A$ |
| additional power-off leakage current | $\Delta I_{OFF}$ | $V_I$ or $V_O=0V$ to $3.6V$ ;<br>$V_{CC}=0V$ to $0.2V$        | - | - | $\pm 4$ | $\mu A$ |
| supply current                       | $I_{CC}$         | $V_I=GND$ or $V_{CC}$ ; $I_O=0A$ ;<br>$V_{CC}=0.8V$ to $3.6V$ | - | - | 4       | $\mu A$ |
| additional supply current            | $\Delta I_{CC}$  | $V_I=V_{CC}-0.6V$ ; $I_O=0A$ ;<br>$V_{CC}=3.3V$               | - | - | 75      | $\mu A$ |

### 3.3.4、AC Characteristics 1

( $T_{amb}=25^{\circ}C$ , voltages are referenced to GND (ground=0V), unless otherwise specified)

| Parameter                        | Symbol                | Conditions   | Min.                      | Typ. <sup>[1]</sup> | Max. | Unit |
|----------------------------------|-----------------------|--------------|---------------------------|---------------------|------|------|
| nA or nB to nY propagation delay | $t_{PLH}$ , $t_{PHL}$ | see Figure 4 | $C_L=5pF$                 |                     |      |      |
|                                  |                       |              | $V_{CC}=0.8V$             |                     |      |      |
|                                  |                       |              | -                         | 16.8                | -    | ns   |
|                                  |                       |              | $V_{CC}=1.1V$ to $1.3V$   |                     |      |      |
|                                  |                       |              | 2.4                       | 5.1                 | 10.9 | ns   |
|                                  |                       |              | $V_{CC}=1.4V$ to $1.6V$   |                     |      |      |
|                                  |                       |              | 1.6                       | 3.6                 | 6.6  | ns   |
|                                  |                       |              | $V_{CC}=1.65V$ to $1.95V$ |                     |      |      |
|                                  |                       |              | 1.4                       | 3.0                 | 5.2  | ns   |
|                                  |                       |              | $V_{CC}=2.3V$ to $2.7V$   |                     |      |      |
|                                  |                       |              | 1.1                       | 2.4                 | 3.9  | ns   |
|                                  |                       |              | $V_{CC}=3.0V$ to $3.6V$   |                     |      |      |
|                                  |                       |              | 1.0                       | 2.1                 | 3.5  | ns   |
|                                  |                       |              | $C_L=10pF$                |                     |      |      |
|                                  |                       |              | $V_{CC}=0.8V$             |                     |      |      |
|                                  |                       |              | -                         | 20.3                | -    | ns   |
|                                  |                       |              | $V_{CC}=1.1V$ to $1.3V$   |                     |      |      |
|                                  |                       |              | 2.3                       | 5.9                 | 12.7 | ns   |
|                                  |                       |              | $V_{CC}=1.4V$ to $1.6V$   |                     |      |      |
|                                  |                       |              | 1.9                       | 4.2                 | 7.7  | ns   |
|                                  |                       |              | $V_{CC}=1.65V$ to $1.95V$ |                     |      |      |
|                                  |                       |              | 1.7                       | 3.5                 | 6.0  | ns   |
|                                  |                       |              | $V_{CC}=2.3V$ to $2.7V$   |                     |      |      |
|                                  |                       |              | 1.4                       | 2.9                 | 4.6  | ns   |
|                                  |                       |              | $V_{CC}=3.0V$ to $3.6V$   |                     |      |      |
|                                  |                       |              | 1.3                       | 2.7                 | 4.3  | ns   |
|                                  |                       |              | $C_L=15pF$                |                     |      |      |
|                                  |                       |              | $V_{CC}=0.8V$             |                     |      |      |
|                                  |                       |              | -                         | 23.8                | -    | ns   |
|                                  |                       |              | $V_{CC}=1.1V$ to $1.3V$   |                     |      |      |
|                                  |                       |              | 3.3                       | 6.7                 | 14.3 | ns   |
|                                  |                       |              | $V_{CC}=1.4V$ to $1.6V$   |                     |      |      |
|                                  |                       |              | 2.3                       | 4.8                 | 8.6  | ns   |
|                                  |                       |              | $V_{CC}=1.65V$ to $1.95V$ |                     |      |      |
|                                  |                       |              | 2.0                       | 4.0                 | 6.7  | ns   |
|                                  |                       |              | $V_{CC}=2.3V$ to $2.7V$   |                     |      |      |
|                                  |                       |              | 1.7                       | 3.3                 | 5.3  | ns   |
|                                  |                       |              | $V_{CC}=3.0V$ to $3.6V$   |                     |      |      |
|                                  |                       |              | 1.5                       | 3.1                 | 4.9  | ns   |
|                                  |                       |              | $C_L=30pF$                |                     |      |      |
|                                  |                       |              | $V_{CC}=0.8V$             |                     |      |      |
|                                  |                       |              | -                         | 34.1                | -    | ns   |
|                                  |                       |              | $V_{CC}=1.1V$ to $1.3V$   |                     |      |      |
|                                  |                       |              | 4.5                       | 9.0                 | 19.1 | ns   |
|                                  |                       |              | $V_{CC}=1.4V$ to $1.6V$   |                     |      |      |
|                                  |                       |              | 3.4                       | 6.3                 | 11.3 | ns   |
|                                  |                       |              | $V_{CC}=1.65V$ to $1.95V$ |                     |      |      |
|                                  |                       |              | 2.6                       | 5.3                 | 8.9  | ns   |
|                                  |                       |              | $V_{CC}=2.3V$ to $2.7V$   |                     |      |      |
|                                  |                       |              | 2.3                       | 4.4                 | 7.0  | ns   |
|                                  |                       |              | $V_{CC}=3.0V$ to $3.6V$   |                     |      |      |
|                                  |                       |              | 2.2                       | 4.2                 | 6.4  | ns   |



## 3.3.5、AC Characteristics 2

( $T_{amb} = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , voltages are referenced to GND (ground=0V), unless otherwise specified)

| Parameter                              | Symbol                              | Conditions   | Min.                            | Typ. <sup>[1]</sup> | Max. | Unit |    |
|----------------------------------------|-------------------------------------|--------------|---------------------------------|---------------------|------|------|----|
| nA or nB to nY<br>propagation<br>delay | t <sub>PLH</sub> , t <sub>PHL</sub> | see Figure 4 | C <sub>L</sub> =5pF             |                     |      |      |    |
|                                        |                                     |              | V <sub>CC</sub> =1.1V to 1.3V   | 2.1                 | -    | 11.9 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.4V to 1.6V   | 1.4                 | -    | 7.5  | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.65V to 1.95V | 1.2                 | -    | 6.0  | ns |
|                                        |                                     |              | V <sub>CC</sub> =2.3V to 2.7V   | 1.0                 | -    | 4.6  | ns |
|                                        |                                     |              | V <sub>CC</sub> =3.0V~3.6V      | 0.9                 | -    | 4.1  | ns |
|                                        |                                     |              | C <sub>L</sub> =10pF            |                     |      |      |    |
|                                        |                                     |              | V <sub>CC</sub> =1.1V to 1.3V   | 2.1                 | -    | 13.8 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.4V to 1.6V   | 1.7                 | -    | 8.7  | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.65V to 1.95V | 1.5                 | -    | 6.9  | ns |
|                                        |                                     |              | V <sub>CC</sub> =2.3V to 2.7V   | 1.3                 | -    | 5.5  | ns |
|                                        |                                     |              | V <sub>CC</sub> =3.0V to 3.6V   | 1.2                 | -    | 5.0  | ns |
|                                        |                                     |              | C <sub>L</sub> =15pF            |                     |      |      |    |
|                                        |                                     |              | V <sub>CC</sub> =1.1V to 1.3V   | 3.0                 | -    | 15.6 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.4V to 1.6V   | 2.0                 | -    | 9.8  | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.65V to 1.95V | 1.8                 | -    | 7.9  | ns |
|                                        |                                     |              | V <sub>CC</sub> =2.3V to 2.7V   | 1.6                 | -    | 6.3  | ns |
|                                        |                                     |              | V <sub>CC</sub> =3.0V to 3.6V   | 1.5                 | -    | 5.8  | ns |
|                                        |                                     |              | C <sub>L</sub> =30pF            |                     |      |      |    |
|                                        |                                     |              | V <sub>CC</sub> =1.1V to 1.3V   | 4.0                 | -    | 21.5 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.4V to 1.6V   | 2.9                 | -    | 13.3 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.65V to 1.95V | 2.4                 | -    | 10.7 | ns |
|                                        |                                     |              | V <sub>CC</sub> =2.3V to 2.7V   | 2.2                 | -    | 8.4  | ns |
|                                        |                                     |              | V <sub>CC</sub> =3.0V to 3.6V   | 2.1                 | -    | 7.7  | ns |



## 3.3.6、AC Characteristics 3

( $T_{amb} = -40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ , voltages are referenced to GND (ground=0V), unless otherwise specified)

| Parameter                              | Symbol                              | Conditions   | Min.                            | Typ. <sup>[1]</sup> | Max. | Unit |    |
|----------------------------------------|-------------------------------------|--------------|---------------------------------|---------------------|------|------|----|
| nA or nB to nY<br>propagation<br>delay | t <sub>PLH</sub> , t <sub>PHL</sub> | see Figure 4 | C <sub>L</sub> =5pF             |                     |      |      |    |
|                                        |                                     |              | V <sub>CC</sub> =1.1V to 1.3V   | 2.1                 | -    | 13.2 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.4V to 1.6V   | 1.4                 | -    | 8.3  | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.65V to 1.95V | 1.2                 | -    | 6.6  | ns |
|                                        |                                     |              | V <sub>CC</sub> =2.3V to 2.7V   | 1.0                 | -    | 5.1  | ns |
|                                        |                                     |              | V <sub>CC</sub> =3.0V to 3.6V   | 0.9                 | -    | 4.6  | ns |
|                                        |                                     |              | C <sub>L</sub> =10pF            |                     |      |      |    |
|                                        |                                     |              | V <sub>CC</sub> =1.1V to 1.3V   | 2.1                 | -    | 15.2 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.4V to 1.6V   | 1.7                 | -    | 9.6  | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.65V to 1.95V | 1.5                 | -    | 7.7  | ns |
|                                        |                                     |              | V <sub>CC</sub> =2.3V to 2.7V   | 1.3                 | -    | 6.1  | ns |
|                                        |                                     |              | V <sub>CC</sub> =3.0V to 3.6V   | 1.2                 | -    | 5.5  | ns |
|                                        |                                     |              | C <sub>L</sub> =15pF            |                     |      |      |    |
|                                        |                                     |              | V <sub>CC</sub> =1.1V to 1.3V   | 3.0                 | -    | 17.2 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.4V to 1.6V   | 2.0                 | -    | 10.8 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.65V to 1.95V | 1.8                 | -    | 8.7  | ns |
|                                        |                                     |              | V <sub>CC</sub> =2.3V to 2.7V   | 1.6                 | -    | 6.9  | ns |
|                                        |                                     |              | V <sub>CC</sub> =3.0V to 3.6V   | 1.5                 | -    | 6.4  | ns |
|                                        |                                     |              | C <sub>L</sub> =30pF            |                     |      |      |    |
|                                        |                                     |              | V <sub>CC</sub> =1.1V to 1.3V   | 4.0                 | -    | 23.7 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.4V to 1.6V   | 2.9                 | -    | 14.7 | ns |
|                                        |                                     |              | V <sub>CC</sub> =1.65V to 1.95V | 2.4                 | -    | 11.8 | ns |
|                                        |                                     |              | V <sub>CC</sub> =2.3V to 2.7V   | 2.2                 | -    | 9.3  | ns |
|                                        |                                     |              | V <sub>CC</sub> =3.0V to 3.6V   | 2.1                 | -    | 8.5  | ns |



## 4、Testing Circuit

### 4.1、AC Testing Circuit

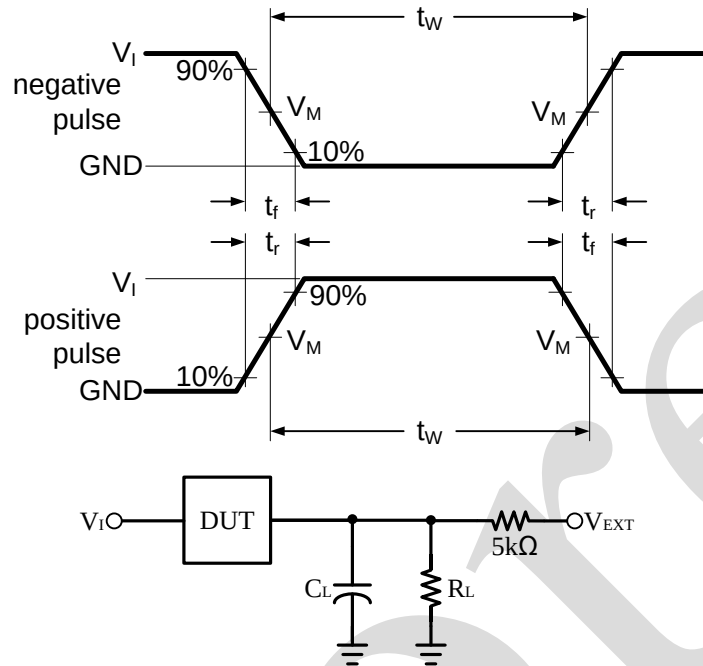


Figure 3. Test circuit for measuring switching times

Definitions for test circuit:

$C_L$  includes probe and jig capacitance.

$R_L$ =Load resistance.

### 4.2、AC Testing Waveforms

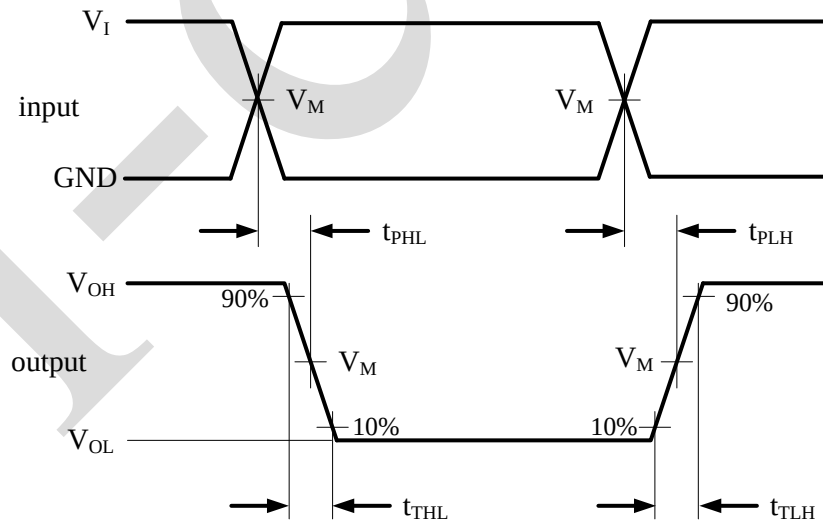


Figure 4. The data input (nA or nB ) to output (nY) propagation delays



## 4.3、Measurement Points

| Supply voltage | Output              | Input               |          |              |
|----------------|---------------------|---------------------|----------|--------------|
| $V_{CC}$       | $V_M$               | $V_M$               | $V_I$    | $t_r=t_f$    |
| 0.8V to 3.6V   | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{CC}$ | $\leq 3.0ns$ |

## 4.4、Test Data

| Supply voltage | Load                     |                            | $V_{EXT}$          |                    |                    |
|----------------|--------------------------|----------------------------|--------------------|--------------------|--------------------|
| $V_{CC}$       | $C_L$                    | $R_L^{[1]}$                | $t_{PLH}, t_{PHL}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 0.8V to 3.6V   | 5pF, 10pF, 15pF and 30pF | 5k $\Omega$ or 1M $\Omega$ | open               | GND                | $2 \times V_{CC}$  |

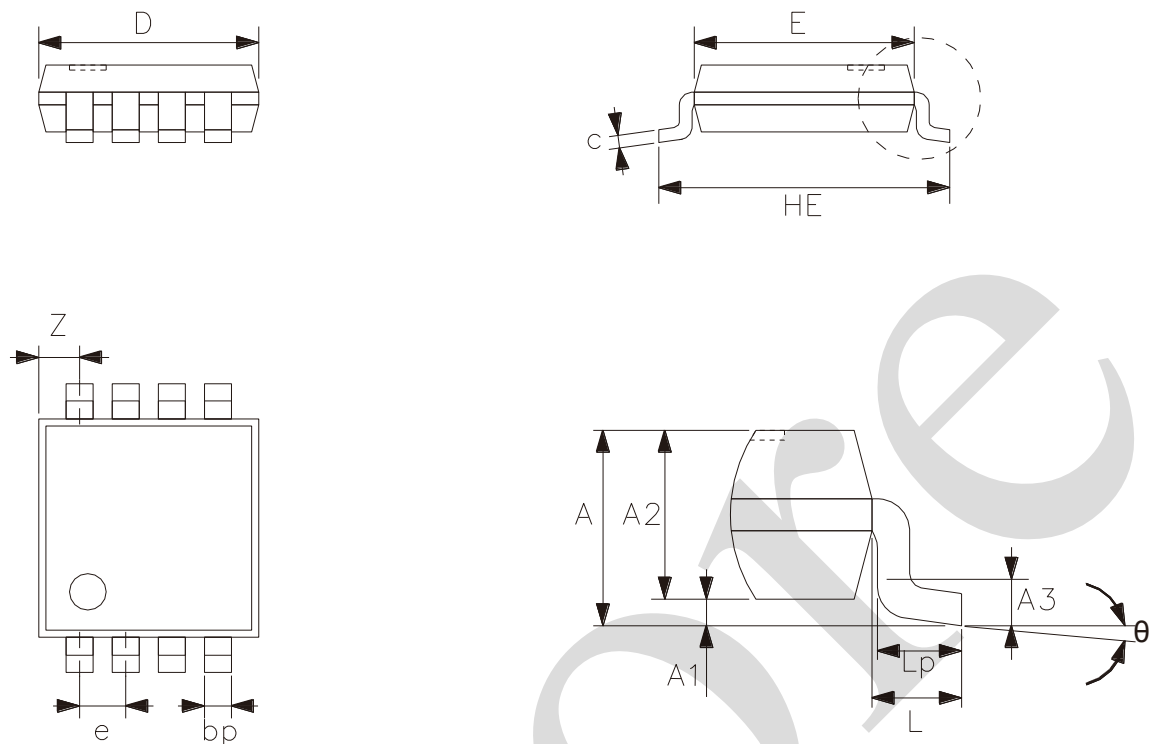
Note:

[1] For measuring enable and disable times  $R_L=5k\Omega$ , for measuring propagation delays, set-up and hold times and pulse width  $R_L=1M\Omega$ .



## 5、Package Information

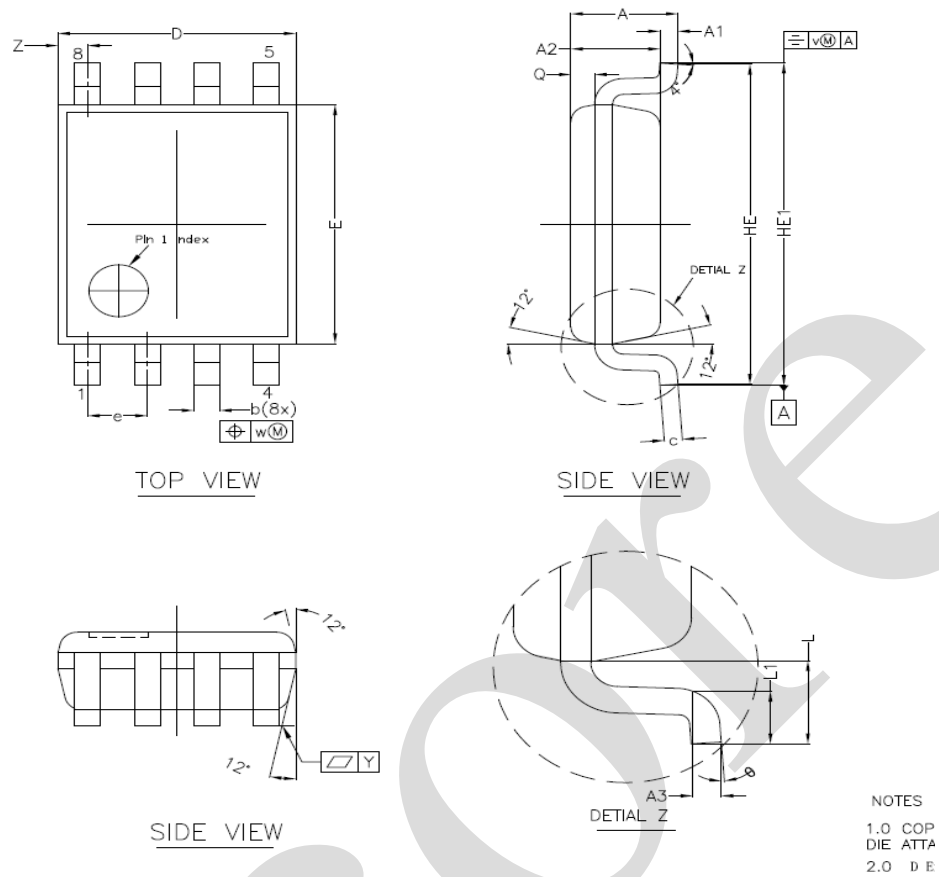
### 5.1、TSSOP8



| Symbol   | Dimensions (mm) |      |
|----------|-----------------|------|
|          | Min.            | Max. |
| A        | -               | 1.10 |
| A1       | 0               | 0.15 |
| A2       | 0.75            | 0.95 |
| A3       | 0.25            |      |
| bp       | 0.22            | 0.38 |
| c        | 0.08            | 0.18 |
| D        | 2.90            | 3.10 |
| E        | 2.90            | 3.10 |
| HE       | 3.90            | 4.10 |
| L        | 0.50            |      |
| Lp       | 0.33            | 0.47 |
| e        | 0.65            |      |
| Z        | 0.35            | 0.70 |
| $\theta$ | 0°              | 8°   |



## 5.2、VSSOP8



| Symbol | Dimensions (mm) |      |
|--------|-----------------|------|
|        | Min.            | Max. |
| A      | -               | 1.00 |
| A1     | 0.00            | 0.15 |
| A2     | 0.60            | 0.85 |
| A3     | 0.12            |      |
| Q      | 0.19            | 0.21 |
| b      | 0.17            | 0.27 |
| c      | 0.08            | 0.23 |
| D      | 1.90            | 2.10 |
| E      | 2.20            | 2.40 |
| HE     | 3.00            | 3.20 |
| HE1    | 3.00            | 3.40 |
| e      | 0.50            |      |
| L      | 0.40            |      |
| L1     | 0.15            | 0.40 |
| Y      | 0.10            |      |
| Z      | 0.10            | 0.40 |
| θ      | 0°              | 8°   |





## 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             | <p>○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard.</p> <p>×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.</p> |                               |                               |                               |                          |                                |                   |                       |                           |                      |

### 6.2、Notes

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