

### Features

- Operate from 1.65V to 5.5V
- Inputs Accept Voltages to 5.5V
- I<sub>OFF</sub> supports partial-power-down mode
- Low static power consumption; ICC=10μA (Max.)
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)

### Applications

- AV Receiver
- Audio Dock:Portable
- Blu-ray Player and Home Theater
- Embedded PC
- Personal Digital Assistant(PDA)
- Power:Telecom/Server AC/DC Supply:Single Controller:Analog and Digital
- Solid State Drive(SSD):Client and Enterprise
- Wireless Headset,Keyboard,and Mouse

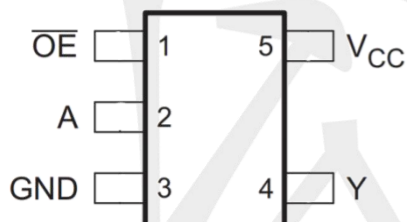
### General Description

The is a single line driver with a 3-state output. The output is disabled when the output-enable ( $\overline{OE}$ ) input is high. To ensure the high-impedance state during power up or power down,  $\overline{OE}$  should be tied to VCC through a pullup resistor, the minimum value of the resistor is determined by the current-sinking capability of the driver.

### Logic Diagram



### Pin Configuratio



SOT23-5

### Function Table

| INPUT( $\overline{OE}$ ) | INPUT(A) | OUTPUT(Y) |
|--------------------------|----------|-----------|
| L                        | H        | L         |
| L                        | L        | H         |
| H                        | X        | Z         |

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

### Absolute Maximum Ratings (Unless otherwise specified)

| PARAMETER                 | SYMBOL | CONDITIONS                      | RATINGS          | UNIT |
|---------------------------|--------|---------------------------------|------------------|------|
| Supply Voltage            | VCC    |                                 | -0.5 ~ +6.5      | V    |
| Input Voltage             | VIN    |                                 | -0.5 ~ +6.5      | V    |
| Output Voltage            | VOUT   | Output in the high or low state | -0.5 ~ VCC + 0.5 | V    |
|                           |        | Output in the power-off state   | -0.5 ~ +6.5      | V    |
| VCC or GND Current        | ICC    |                                 | ±100             | mA   |
| Continuous Output Current | IOUT   | VOUT=0~VCC                      | ±50              | mA   |
| Input Clamp Current       | IIK    | VIN<0                           | -50              | mA   |
| Output Clamp Current      | IOK    | VOUT>VCC or VOUT<0V             | -50              | mA   |
| Storage Temperature Range | TSTG   |                                 | -65 ~ +150       | °C   |
| Junction to Ambient       | θJA    | SOT-23-5                        | 230              | °C/W |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### Recommended Operating Conditions (Unless otherwise specified)

| PARAMETER                                | SYMBOL | TEST CONDITIONS           | MIN  | TYP | MAX  | UNIT |
|------------------------------------------|--------|---------------------------|------|-----|------|------|
| Supply Voltage                           | VCC    | Operating                 | 1.65 | --  | 5.5  | V    |
|                                          |        | Data retention only       | 1.5  |     |      | V    |
| Input Voltage                            | VIN    |                           | 0    | --  | 5.5  | V    |
| Output Voltage                           | VOUT   | High or low state         | 0    | --  | VCC  | V    |
| Input Transition<br>Rise or Fall<br>Rate | Δt/Δv  | VCC=1.8V±0.15V, 2.5V±0.2V | --   | --  | 20   | ns/V |
|                                          |        | VCC=3.3V±0.3V             | --   | --  | 10   | ns/V |
|                                          |        | VCC=5V±0.5V               | --   | --  | 5    | ns/V |
| Operating Temperature                    | TA     |                           | -40  | --  | +125 | °C   |

### Electrical Characteristics (unless otherwise specified)

| PARAMETER                                         | SYMBOL          | TEST Conditions                                                                     | MIN                  | TYP       | MAX                  | UNIT    |
|---------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|----------------------|-----------|----------------------|---------|
| High-Level Input Voltage                          | $V_{IH}$        | $V_{CC}=1.8V \pm 0.15V$                                                             | $0.65 \times V_{CC}$ | --        | --                   | V       |
|                                                   |                 | $V_{CC}=2.5 \pm 0.2V$                                                               | 1.7                  | --        | --                   | V       |
|                                                   |                 | $V_{CC}=3.3 \pm 0.3V$                                                               | 2                    | --        | --                   | V       |
|                                                   |                 | $V_{CC}=5 \pm 0.5V$                                                                 | $0.7 \times V_{CC}$  | --        | --                   | V       |
| Low-Level Input Voltage                           | $V_{IL}$        | $V_{CC}=1.8V \pm 0.15V$                                                             | --                   | --        | $0.35 \times V_{CC}$ | V       |
|                                                   |                 | $V_{CC}=2.5 \pm 0.2V$                                                               | --                   | --        | 0.7                  | V       |
|                                                   |                 | $V_{CC}=3.3 \pm 0.3V$                                                               | --                   | --        | 0.8                  | V       |
|                                                   |                 | $V_{CC}=5 \pm 0.5V$                                                                 | --                   | --        | $0.35 \times V_{CC}$ | V       |
| High-Level Output Voltage                         | $V_{OH}$        | $V_{CC}=1.65 \sim 5.5V, I_{OH}=-100\mu A$                                           | $V_{CC}-0.1$         | --        | --                   | V       |
|                                                   |                 | $V_{CC}=1.65V, I_{OH}=-4mA$                                                         | 1.2                  | --        | --                   | V       |
|                                                   |                 | $V_{CC}=2.3V, I_{OH}=-8mA$                                                          | 1.9                  | --        | --                   | V       |
|                                                   |                 | $V_{CC}=3.0V, I_{OH}=-16mA$                                                         | 2.4                  | --        | --                   | V       |
|                                                   |                 | $V_{CC}=3.0V, I_{OH}=-24mA$                                                         | 2.3                  | --        | --                   | V       |
|                                                   |                 | $V_{CC}=4.5V, I_{OH}=-32mA$                                                         | 3.8                  | --        | --                   | V       |
| Low-Level Output Voltage                          | $V_{OL}$        | $V_{CC}=1.65 \sim 5.5V, I_{OL}=100\mu A$                                            | --                   | --        | 0.1                  | V       |
|                                                   |                 | $V_{CC}=1.65V, I_{OL}=4mA$                                                          | --                   | --        | 0.45                 | V       |
|                                                   |                 | $V_{CC}=2.3V, I_{OL}=8mA$                                                           | --                   | --        | 0.3                  | V       |
|                                                   |                 | $V_{CC}=3.0V, I_{OL}=16mA$                                                          | --                   | --        | 0.4                  | V       |
|                                                   |                 | $V_{CC}=3.0V, I_{OL}=24mA$                                                          | --                   | --        | 0.55                 | V       |
|                                                   |                 | $V_{CC}=4.5V, I_{OL}=32mA$                                                          | --                   | --        | 0.55                 | V       |
| Input Leakage Current                             | $I_{I(LEAK)}$   | $V_{CC}=0 \sim 5.5V, V_{IN}=5.5V$ or GND                                            | --                   | $\pm 0.1$ | $\pm 5$              | $\mu A$ |
| Power OFF Leakage Current                         | $I_{OFF}$       | $V_{CC}=0V, V_{IN}$ or $V_{OUT}=5.5V$                                               | --                   | $\pm 0.1$ | $\pm 10$             | $\mu A$ |
| OFF-state output current                          | $I_{OZ}$        | $V_{CC}=3.6V, V_{IN} = V_{IH}$ or $V_{IL}, V_{OUT}=5.5V$ or GND                     | --                   | --        | 10                   | $\mu A$ |
| Quiescent Supply Current                          | $I_{CC}$        | $V_{CC}=1.65 \sim 5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$                          | --                   | --        | 10                   | $\mu A$ |
| Additional Quiescent Supply Current Per Input Pin | $\Delta I_{CC}$ | $V_{CC}=3 \sim 5.5V$ , One input at $V_{CC}-0.6V$ , Other inputs at $V_{CC}$ or GND | --                   | --        | 500                  | $\mu A$ |
| Input Capacitance                                 | $C_I$           | $V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND                                                 | --                   | 4.0       | --                   | PF      |

### SWITCHING CHARACTERISTICS

( unless otherwise specified)

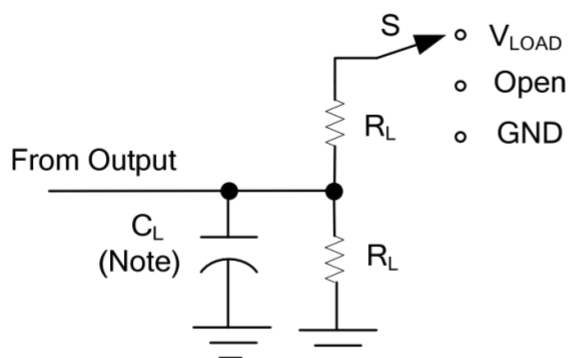
| PARAMETER                                                              | SYMBOL    | TEST Conditions              |                      | MIN | TYP | MAX | UNIT |
|------------------------------------------------------------------------|-----------|------------------------------|----------------------|-----|-----|-----|------|
| Propagation Delay<br>From<br>Input A to Output Y                       | $t_{PD}$  | $C_L=15pF$<br>$R_L=1M\Omega$ | $V_{CC}=1.8\pm0.15V$ | 2.1 | --  | 6.9 | nS   |
|                                                                        |           |                              | $V_{CC}=2.5\pm0.2V$  | 0.9 | --  | 4.6 | nS   |
|                                                                        |           |                              | $V_{CC}=3.3\pm0.3V$  | 0.7 | --  | 3.7 | nS   |
|                                                                        |           |                              | $V_{CC}=5\pm0.5V$    | 0.5 | --  | 3.4 | nS   |
|                                                                        |           | $CL=30pF, RL=1K\Omega$       | $V_{CC}=1.8\pm0.15V$ | 3.0 | --  | 8.6 | nS   |
|                                                                        |           | $CL=30pF, RL=500\Omega$      | $V_{CC}=2.5\pm0.2V$  | 1.4 | --  | 5.5 | nS   |
|                                                                        |           | $CL=50pF$<br>$RL=500\Omega$  | $V_{CC}=3.3\pm0.3V$  | 1.1 | --  | 4.5 | nS   |
|                                                                        |           |                              | $V_{CC}=5\pm0.5V$    | 1.0 | --  | 4.0 | nS   |
| Propagation delay<br>from input<br>( $\overline{OE}$ ) to output(Y)    | $t_{en}$  | $CL=30pF, RL=1K\Omega$       | $V_{CC}=1.8\pm0.15V$ | 3.8 | --  | 10  | nS   |
|                                                                        |           | $CL=30pF, RL=500\Omega$      | $V_{CC}=2.5\pm0.2V$  | 2.1 | --  | 6.5 | nS   |
|                                                                        |           | $CL=50pF$<br>$RL=500\Omega$  | $V_{CC}=3.3\pm0.3V$  | 1.4 | --  | 5.4 | nS   |
|                                                                        |           |                              | $V_{CC}=5\pm0.5V$    | 1.1 | --  | 5.2 | nS   |
| Propagation delay<br>from<br>input ( $\overline{OE}$ ) to<br>output(Y) | $t_{dis}$ | $CL=30pF, RL=1K\Omega$       | $V_{CC}=1.8\pm0.15V$ | 2.1 | --  | 9.4 | nS   |
|                                                                        |           | $CL=30pF, RL=500\Omega$      | $V_{CC}=2.5\pm0.2V$  | 1.0 | --  | 4.9 | nS   |
|                                                                        |           | $CL=50pF$<br>$RL=500\Omega$  | $V_{CC}=3.3\pm0.3V$  | 1.4 | --  | 5.2 | nS   |
|                                                                        |           |                              | $V_{CC}=5\pm0.5V$    | 1.0 | --  | 4.1 | nS   |

### OPERATING CHARACTERISTICS

( $f=10MHz$ , unless otherwise specified)

| PARAMETER                           | SYMBOL             | TEST Conditions | MIN | TYP | MAX | UNIT |
|-------------------------------------|--------------------|-----------------|-----|-----|-----|------|
| Power<br>Dissipation<br>Capacitance | Output<br>enabled  | $V_{CC}=1.8V$   | --  | 17  | --  | PF   |
|                                     |                    | $V_{CC}=2.5V$   | --  | 17  | --  | PF   |
|                                     |                    | $V_{CC}=3.3V$   | --  | 18  | --  | PF   |
|                                     |                    | $V_{CC}=5V$     | --  | 20  | --  | PF   |
|                                     | Output<br>disabled | $V_{CC}=1.8V$   | --  | 1.0 | --  | PF   |
|                                     |                    | $V_{CC}=2.5V$   | --  | 1.0 | --  | PF   |
|                                     |                    | $V_{CC}=3.3V$   | --  | 1.0 | --  | PF   |
|                                     |                    | $V_{CC}=5V$     | --  | 2.0 | --  | PF   |

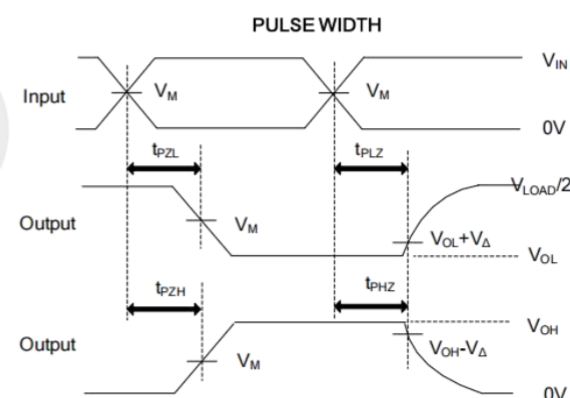
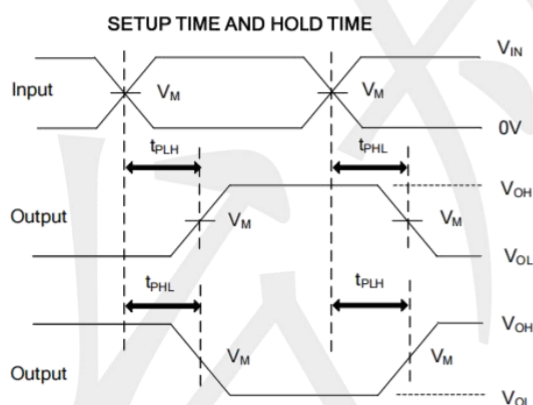
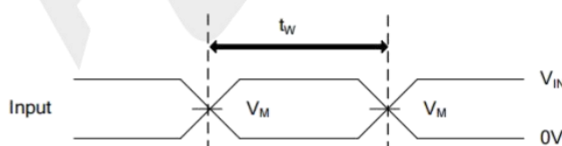
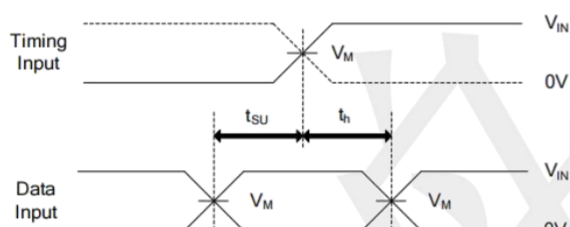
## TEST CIRCUIT AND WAVEFORMS



| TEST              | S          |
|-------------------|------------|
| $t_{PLH}/t_{PHL}$ | Open       |
| $t_{PLZ}/t_{PZL}$ | $V_{LOAD}$ |
| $t_{PHZ}/t_{PZH}$ | GND        |

Note:  $C_L$  includes probe and jig capacitance.

| $V_{CC}$         | $V_{IN}$ | $t_R / t_F$  | $V_M$      | $V_{LOAD}$        | $C_L$ | $R_L$        | $V_{\Delta}$ |
|------------------|----------|--------------|------------|-------------------|-------|--------------|--------------|
| $1.8V \pm 0.15V$ | $V_{CC}$ | $\leq 2ns$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 30pF  | 1K $\Omega$  | 0.15V        |
| $2.5V \pm 0.2V$  | $V_{CC}$ | $\leq 2ns$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 30pF  | 500 $\Omega$ | 0.15V        |
| $3.3V \pm 0.3V$  | 3V       | $\leq 2.5ns$ | 1.5V       | 6V                | 50pF  | 500 $\Omega$ | 0.3V         |
| $5V \pm 0.5V$    | $V_{CC}$ | $\leq 2.5ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 50pF  | 500 $\Omega$ | 0.3V         |



PROPAGATION DELAY TIMES

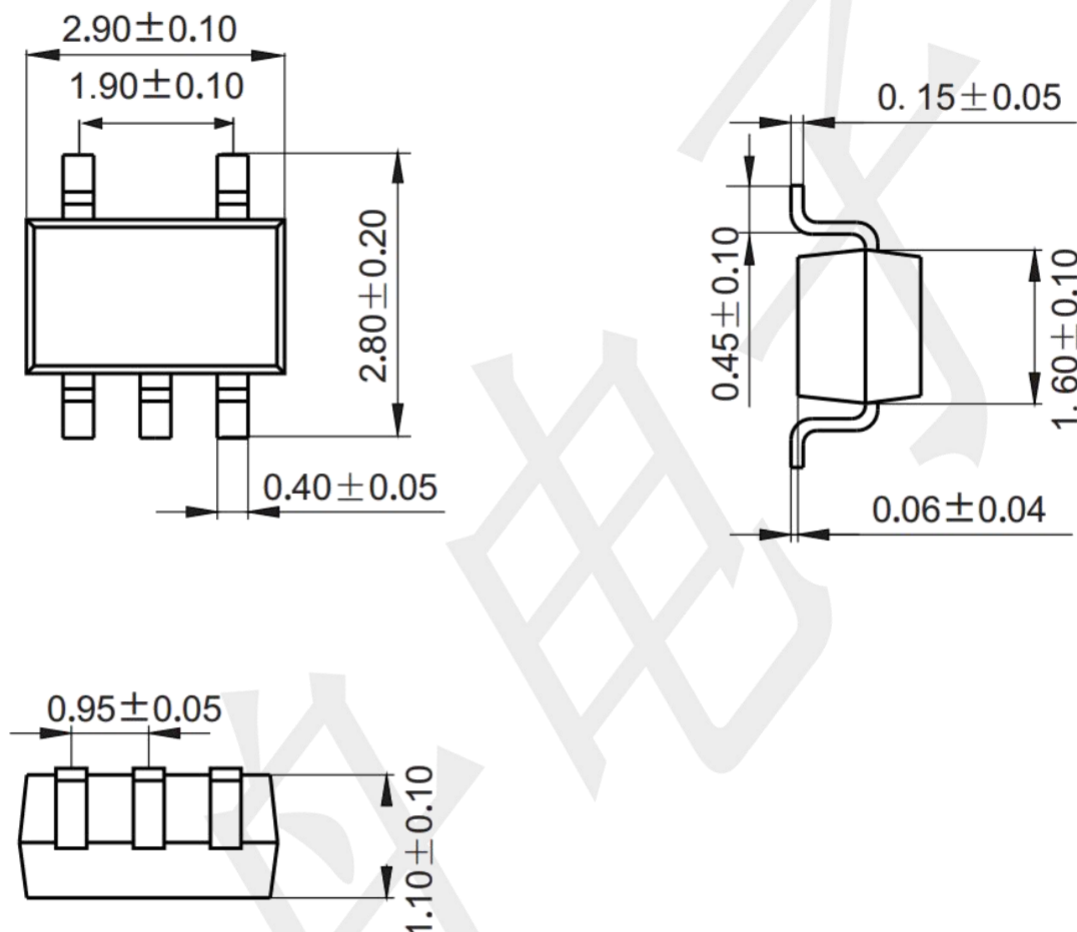
ENABLE AND DISABLE TIMES

Notes: 1.  $C_L$  includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR  $\leq 10MHz$ ,  $Z_O = 50\Omega$ .

## Package informantion

SOT23-5 (Unit: mm)



## Mounting Pad Layout (unit: mm)

