

# PI74ST1G126

## SOTiny™ Logic Buffer with 3-State Output

### Features

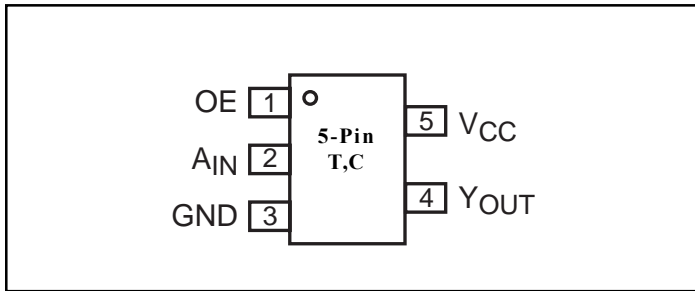
- High-speed:  $t_{PD} = 1.8\text{ns}$  typical
- Broad operating range:  $V_{CC} = 1.8\text{V} - 3.6\text{V}$
- Power down high-impedance inputs/outputs
- High output drive:  $\pm 24\text{mA}$  at  $3\text{V } V_{CC}$
- Package: 5-pin space saving SOT23 and SC70

### Description

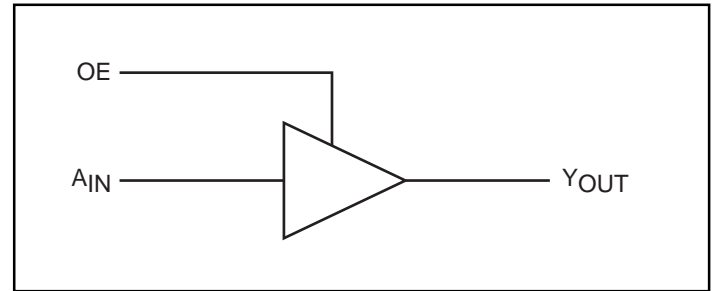
The PI74ST1G126 is a buffer with 3-state output that operates over the 1.8V to 3.6V  $V_{CC}$  operating range.

Pericom's PI74ST series of products are produced using the Company's advanced submicron technology.

### Pinout



### Block Diagram



### Pin Description

| Pin Names | Description |
|-----------|-------------|
| $A_{IN}$  | Input       |
| OE        | Input       |
| $Y_{OUT}$ | Output      |

### Recommended Operating Conditions<sup>(1)</sup>

| Parameter                               | Condition   | Min. | Max.     | Units |
|---|---|------|----------|-------|
| Supply Voltage ( $V_{CC}$ )             |   | 1.8  | 3.6      | V     |
| Input Voltage ( $V_{IN}$ )              |   | 0    | 5.5      |       |
| Output Voltage ( $V_{OUT}$ )            |   | 0    | $V_{CC}$ |       |
| Operating Temperature                   |   | -40  | 85       | °C    |
| Input Rise and Fall Time ( $t_r, t_f$ ) | $V_{CC} = 1.8\text{V}, 2.5\text{V} \pm 0.2\text{V}$ | 0    | 20       | ns/V  |
|   | $V_{CC} = 3.3\text{V}, \pm 0.3\text{V}$             | 0    | 10       |       |

### Function Table

| Inputs |          | Output    |
|--------|----------|-----------|
| OE     | $A_{IN}$ | $Y_{OUT}$ |
| H      | L        | L         |
| H      | H        | H         |
| L      | X        | Z         |

### Note:

1. Unused inputs must be held HIGH or LOW. They may not float.

### Notes:

- H = HIGH Logic Level
- L = LOW Logic Level
- X = Don't Care
- Z = HIGH Impedance State

### Absolute Maximum Ratings

|  |                 |
|--|-----------------|
| Supply Voltage ( $V_{CC}$ )                  | -0.5V to +4V    |
| DC Input Voltage ( $V_{IN}$ )                | -0.5V to +6V    |
| DC Output Voltage ( $V_{OUT}$ )              | -0.5V to +6V    |
| DC Input Diode Current ( $I_{IK}$ )          | -50mA to 20mA   |
| DC Output Diode Current ( $I_{OK}$ )         | -50mA to 20mA   |
| DC Output Current ( $I_{OUT}$ )              | ±50mA           |
| DC $V_{CC}/GND$ Current ( $I_{CC}/I_{GND}$ ) | ±50mA           |
| Storage Temperature ( $T_{STG}$ )            | -65°C to +150°C |
| Junction Lead Temperature (IOS)              | 200°C           |
| Power Dissipation SOT23                      | 200mW           |
| SC70   | 150mW           |

**Note:**

Absolute maximum ratings are DC values beyond which the device may be damaged or have its useful life impaired. The datasheet specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Pericom does not recommend operation outside datasheet specifications.

### DC Electrical Characteristics (Over supply voltage and operating temperature ranges, unless otherwise specified)

| Symbol    | Parameter                 | $V_{CC}$ (V)   | Conditions   |                            | $T_A = +25^\circ\text{C}$    |      |                              | $T_A = -40^\circ\text{C}$<br>to $+85^\circ\text{C}$ |      | Units         |
|-----------|---------------------------|----------------|--|----------------------------|------------------------------|------|------------------------------|---|------|---------------|
|           |                           |                |  |                            | Min.                         | Typ. | Max.                         | Min.  | Max. |               |
| $V_{IH}$  | HIGH Level Input Voltage  | 1.8<br>2.3-3.6 |  |                            | $0.75V_{CC}$<br>$0.70V_{CC}$ |      |                              | $0.75V_{CC}$<br>$0.70V_{CC}$                        |      | V             |
| $V_{IL}$  | LOW Level Input Voltage   | 1.8<br>2.3-3.6 |  |                            |                              |      | $0.25V_{CC}$<br>$0.30V_{CC}$ | $0.25V_{CC}$<br>$0.30V_{CC}$                        |      |               |
| $V_{OH}$  | HIGH Level Output Voltage | 1.8            | $V_{IN} = V_{IH}$  | $I_{OH} = -100\mu\text{A}$ | 1.7                          | 1.79 |                              | 1.7   |      |               |
|           |                           | 2.3            |  |                            | 2.2                          | 2.29 |                              | 2.2   |      |               |
|           |                           | 3.0            |  |                            | 2.9                          | 2.99 |                              | 2.9   |      |               |
|           |                           | 2.3            |  |                            |                              |      |                              |   |      |               |
| $V_{OL}$  | LOW Level Output Voltage  | 3.0            |  | $I_{OH} = -8\text{mA}$     | 1.9                          | 2.13 |                              | 1.9   |      |               |
|           |                           | 3.0            |  | $I_{OH} = -16\text{mA}$    | 2.4                          | 2.71 |                              | 2.4   |      |               |
|           |                           | 3.0            |  | $I_{OH} = -24\text{mA}$    | 2.3                          | 2.55 |                              | 2.3   |      |               |
|           |                           | 2.3            |  |                            |                              |      |                              |   |      |               |
| $V_{OL}$  | LOW Level Output Voltage  | 1.8            | $V_{IN} = V_{IL}$  | $I_{OL} = 100\mu\text{A}$  |                              | 0.01 | 0.1                          |   | 0.1  |               |
|           |                           | 2.3            |  |                            |                              | 0.01 | 0.1                          |   | 0.1  |               |
|           |                           | 3.0            |  |                            |                              | 0.00 | 0.1                          |   | 0.1  |               |
|           |                           | 2.3            |  |                            |                              |      |                              |   |      |               |
| $V_{OL}$  | LOW Level Output Voltage  | 3.0            |  | $I_{OL} = 8\text{mA}$      | 0.10                         | 0.3  |                              | 0.3   |      |               |
|           |                           | 3.0            |  | $I_{OL} = 16\text{mA}$     | 0.18                         | 0.4  |                              | 0.4   |      |               |
|           |                           | 3.0            |  | $I_{OL} = 24\text{mA}$     | 0.28                         | 0.55 |                              | 0.55  |      |               |
| $I_{IN}$  | Input Leakage Current     | 0-3.6          | $V_{IN} = 5.5\text{V}, GND$                              |                            | -1                           |      | 1                            | -1  | 1    | $\mu\text{A}$ |
| $I_{OFF}$ | Power Off Leakage Current | 0.0            | $V_{IN}$ or $V_{OUT} = 5.5\text{V}$                      |                            | -1                           |      | 1                            | -1  | 1    |               |
| $I_{CC}$  | Quiescent Supply Current  | 1.8-3.6        | $V_{IN} = 5.5\text{V}, GND$                              |                            |                              |      | 2.0                          |   | 20   |               |
| $I_{OZ}$  | 3-State Output Leakage    | 1.8-3.6        | $V_{IN} = V_{IH}$ or $V_{IL}$<br>$V_O = V_{CC}$ or $GND$ |                            |                              |      | ±1                           |   | ±10  |               |

### AC Electrical Characteristics

| Symbol                                 | Parameter                               | V <sub>CC</sub> (V)                         | Conditions   | T <sub>A</sub> = +25°C |                   |                   | T <sub>A</sub> = -40°C to +85°C |                   | Units | Fig. No. |
|--|---|---|--|------------------------|-------------------|-------------------|---------------------------------|-------------------|-------|----------|
|  |   |   |  | Min.                   | Typ.              | Max.              | Min.                            | Max.              |       |          |
| t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | Propagation Delay                       | 1.8<br>2.5 ±0.2<br>3.3 ±0.3                 | C <sub>L</sub> = 15pF, R <sub>L</sub> = 1MΩ<br>S <sub>1</sub> = Open   | 2.0<br>0.8<br>0.5      | 2.7<br>1.7<br>1.1 | 3.6<br>2.3<br>1.6 | 2.0<br>0.8<br>0.5               | 4.0<br>2.6<br>1.8 | ns    | 1<br>3   |
| t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | Propagation Delay                       | 3.3 ±0.3                                    | C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω,<br>S <sub>1</sub> = Open   | 1.5                    | 2.7               | 3.6               | 1.5                             | 4.0               |       | 1<br>3   |
| t <sub>PZL</sub> ,<br>t <sub>PZH</sub> | Output Enable Time                      | 1.8<br>2.5 ±0.2<br>3.3 ±0.3                 | C <sub>L</sub> = 50pF, R <sub>D</sub> = 500Ω<br>R <sub>U</sub> = 500Ω, S <sub>1</sub> = GND for t <sub>PZH</sub><br>S <sub>1</sub> = V <sub>IN</sub> for t <sub>PZL</sub><br>V <sub>IN</sub> = 2xV <sub>CC</sub> | 2.0<br>1.5<br>1.5      | 5.9<br>4.0<br>3.0 | 7.8<br>5.4<br>4.1 | 2.0<br>1.5<br>1.5               | 8.6<br>6.0<br>4.5 |       | 1<br>3   |
| t <sub>PLZ</sub> ,<br>t <sub>PHZ</sub> | Output Disable Time                     | 1.8<br>2.5 ±0.2<br>3.3 ±0.3                 | C <sub>L</sub> = 50pF, R <sub>D</sub> = 500Ω<br>R <sub>U</sub> = 500Ω, S <sub>1</sub> = GND for t <sub>PHZ</sub><br>S <sub>1</sub> = V <sub>IN</sub> for t <sub>PLZ</sub> , V <sub>IN</sub> = 2xV <sub>CC</sub>  | 2.0<br>1.0<br>1.0      | 5.4<br>4.0<br>3.2 | 6.4<br>4.8<br>3.8 | 2.0<br>1.0<br>1.0               | 7.1<br>5.3<br>4.2 |       | 1<br>3   |
| C <sub>IN</sub> ,<br>C <sub>OUT</sub>  | Input Capacitance<br>Output Capacitance | V <sub>IN</sub> = 0<br>V <sub>OUT</sub> = 0 |  |                        | 4<br>8            |                   |                                 |                   | pF    |          |
| C <sub>PD</sub>                        | Power Dissipation<br>Capacitance        | 3.3   | Note 3   |                        | 17                |                   |                                 |                   |       | 2        |

**Notes:**

3. C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I<sub>CCD</sub>) at no output loading and operating at 50% duty cycle (see Figure 2). C<sub>PD</sub> is related to I<sub>CCD</sub> dynamic operating current by the expression: I<sub>CCD</sub> = (C<sub>PD</sub>)(V<sub>CC</sub>)(f<sub>IN</sub>) + (I<sub>CC</sub> static).

### AC Loading and Waveforms

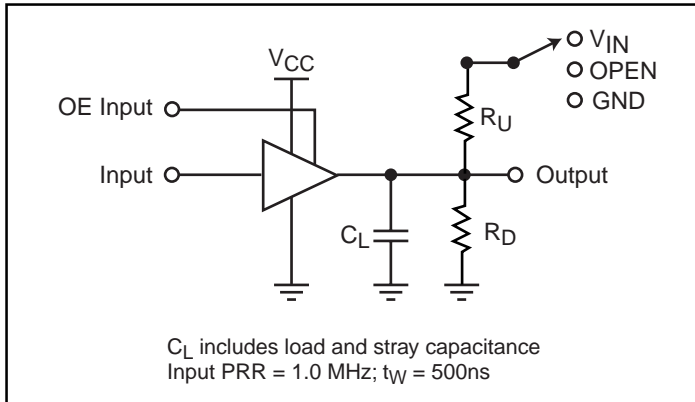


Figure 1. AC Test Circuit

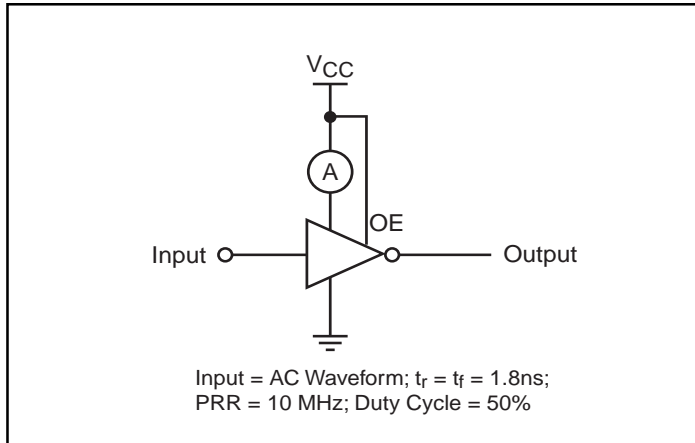


Figure 2.  $I_{CCD}$  Test Circuit

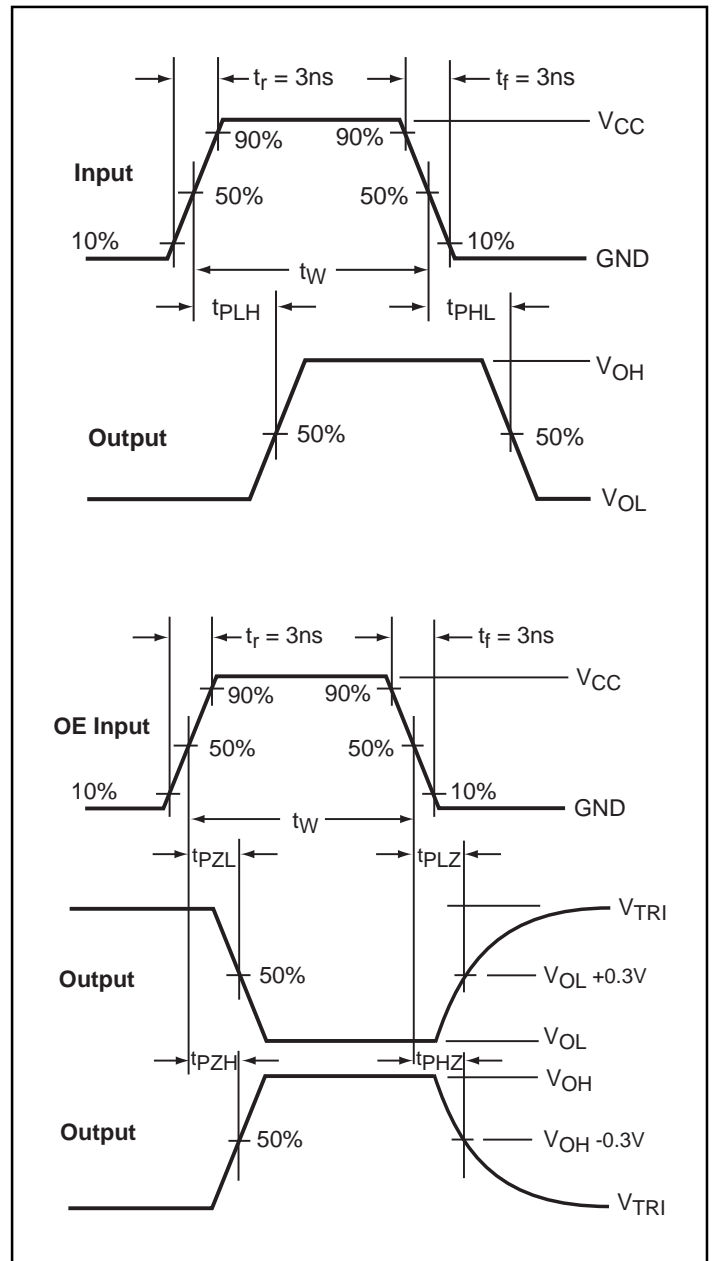
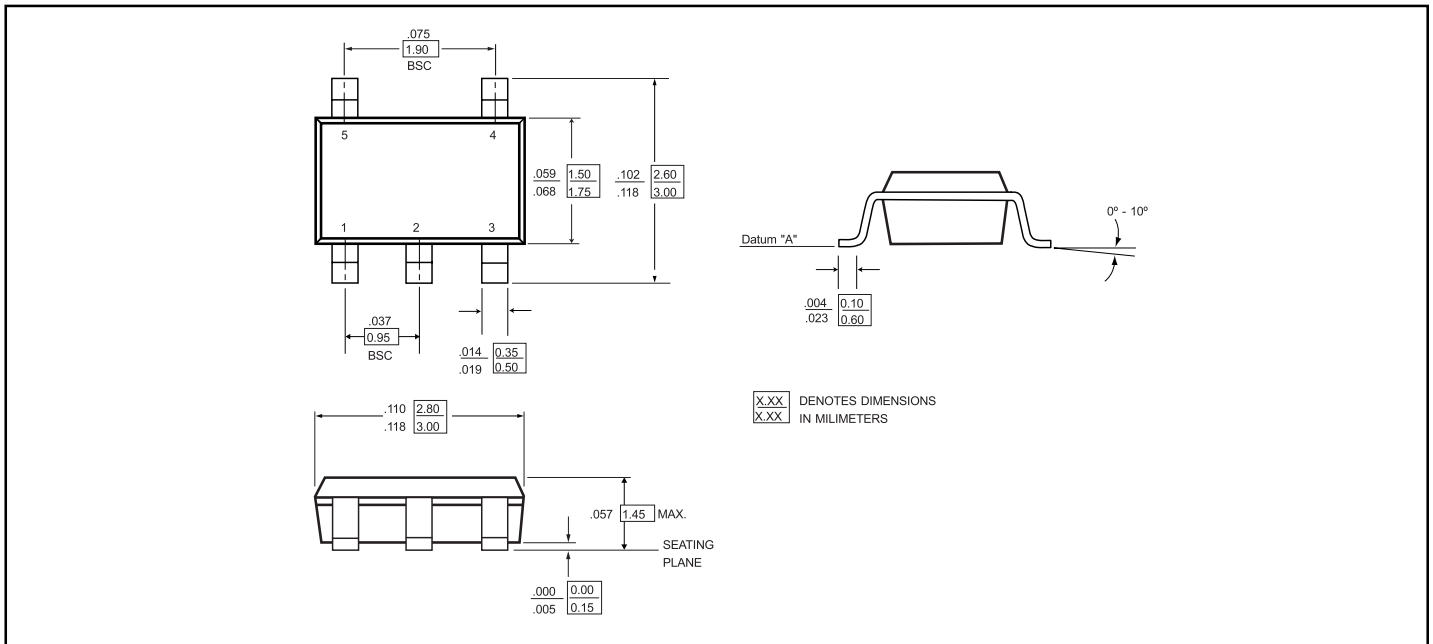
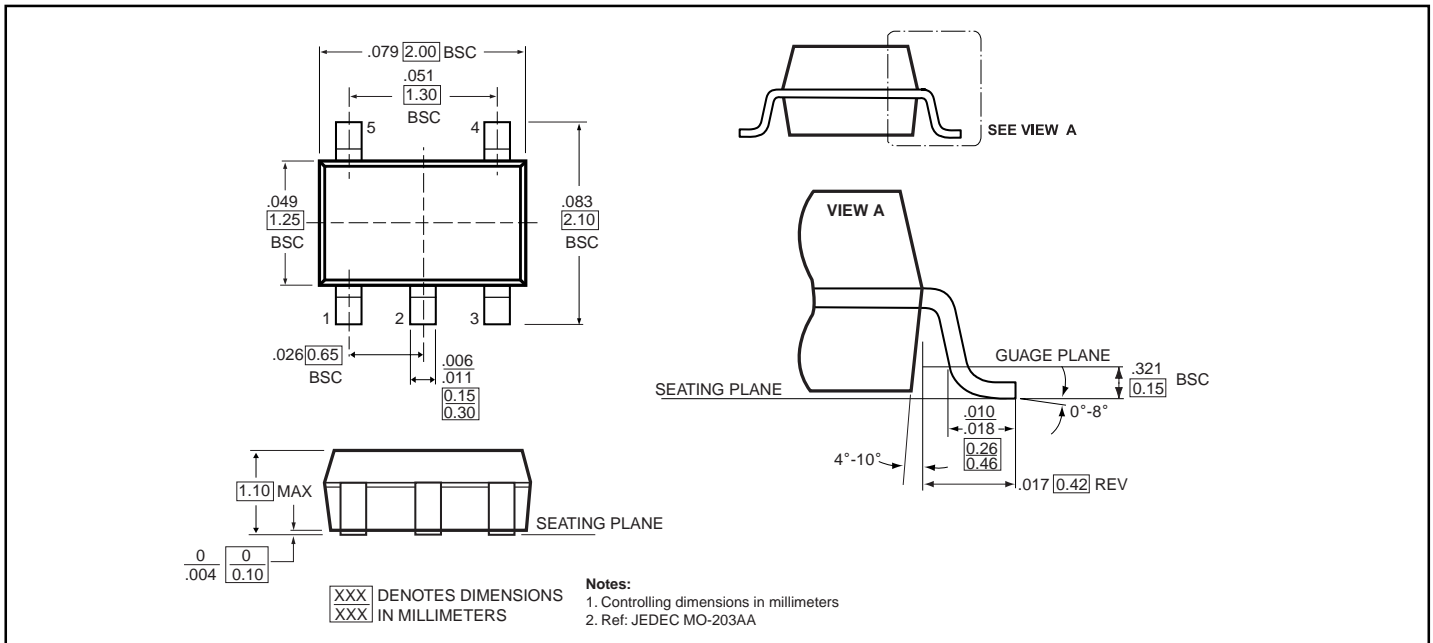


Figure 3. AC Waveforms

### 5-Pin SOT23 Package (T)



### 5-Pin SC70 Package (C)



### Ordering Information

| Part          | Pin-Package   | Top Marking | Operating Range |
|---------------|---------------|-------------|-----------------|
| PI74ST1G126TX | 5-Pin - SOT23 | L7E         | -40°C to 85°C   |
| PI74ST1G126CX | 5-Pin - SC70  | L7E         | -40°C to 85°C   |

### Pericom Semiconductor Corporation

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