# PI74ALVCH16244

## 16-Bit Buffer Driver with 3-State Outputs

### Product Features

- PI74ALVCH16244 is designed for low-voltage operation
- $V_{CC}$ = 2.3V to 3.6V
- Hysteresis on all inputs
- Typical $V_{OLP}$ (Output Ground Bounce)
  < 0.8V at $V_{CC}$ = 3.3V, $T_A$ = 25°C
- Typical $V_{OHV}$ (Output $V_{OH}$ Undershoot)
  < 2.0V at $V_{CC}$ = 3.3V, $T_A$ = 25°C
- Bus Hold retains last active bus state during 3-State, eliminating the need for external pullup resistors
- Industrial operation at –40°C to +85°C
- Packages available:
  – 48-pin 240 mil wide plastic TSSOP (A)
  – 48-pin 300 mil wide plastic SSOP (V)

### Product Description

Pericom Semiconductor's PI74ALVCH series of logic circuits are produced using the Company's advanced 0.5 micron CMOS technology, achieving industry leading speed.

The PI74ALVCH16244 is an non-inverting 16-bit buffer/driver designed for low-voltage 2.3V to 3.6V $V_{CC}$ operation.

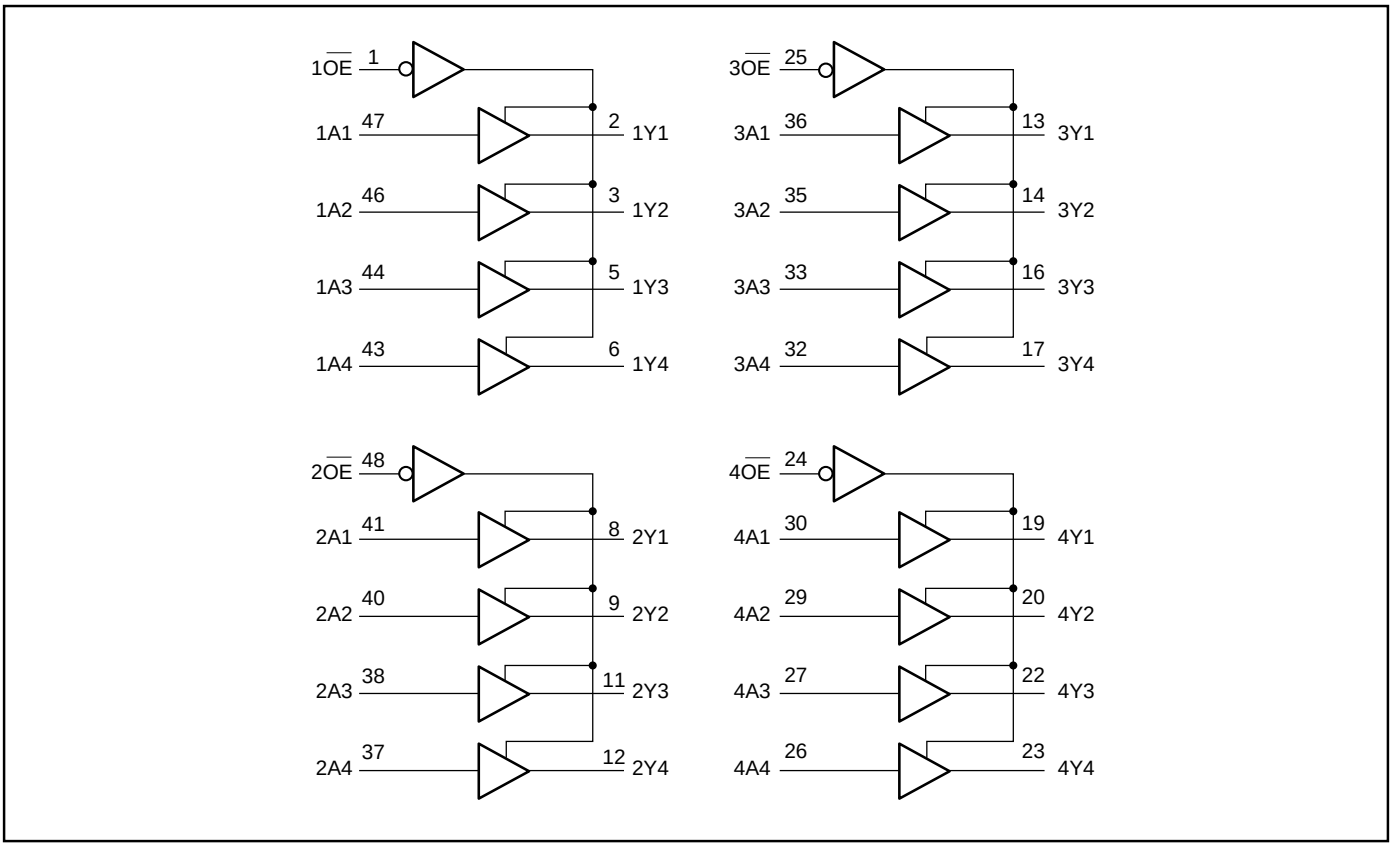
The buffer/driver is designed specifically to improve both the performance and density of 3-State memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

The device can be used as four 4-bit buffers, two 8-bit buffers, or one 16-bit buffer. It provides inverting outputs and symmetrical active-low output-enable ($\overline{OE}$) inputs.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to $V_{CC}$ through a pullup resistor in which the minimum value is determined by the current-sinking capability of the driver.

The PI74ALVCH16244 has "Bus Hold" which retains the data input's last state whenever the data input goes to high-impedance preventing "floating" inputs and eliminating the need for pullup/down resistors.

### Logic Block Diagram



## Product Pin Description

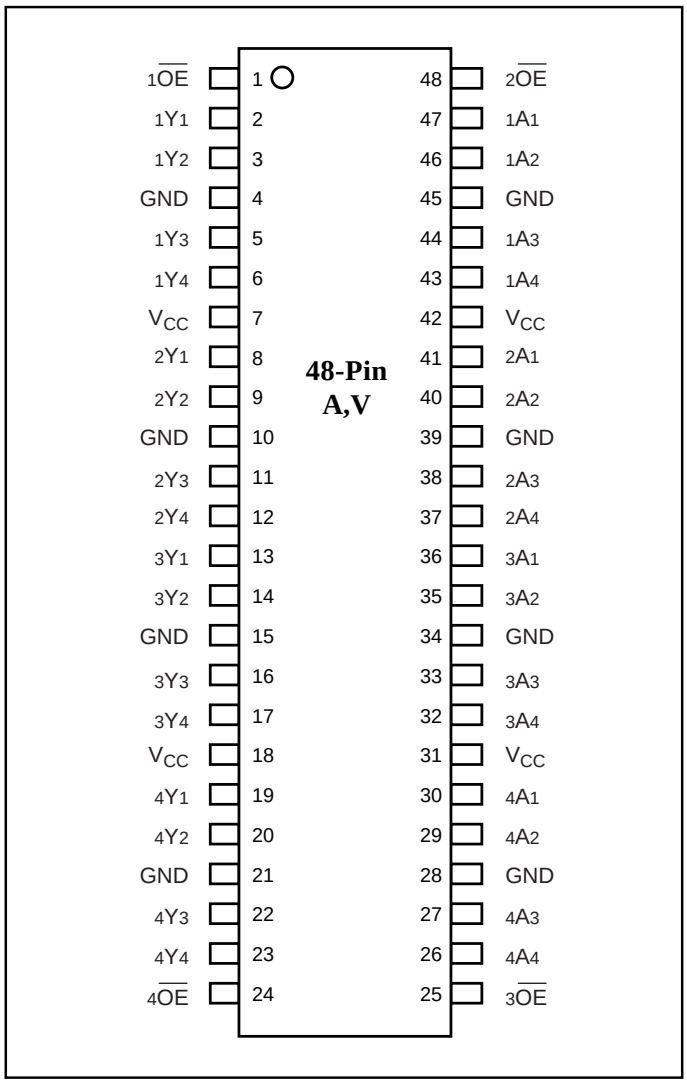
| Pin Name | Description |
|---|---|
| n$\overline{OE}$ | 3-State Output Enable Inputs (Active LOW) |
| nAx | Inputs |
| nYx | 3-State Outputs |
| GND | Ground |
| $V_{CC}$ | Power |

## Truth Table[1]

| Inputs | | Outputs |
|---|---|---|
| n$\overline{OE}$ | nAx | nYx |
| L | H | H |
| L | L | L |
| H | X | Z |

**Notes:**
1. H = High Signal Level
   L = Low Signal Level
   X = Don't Care or Irrelevant
   Z = High Impedance

## Product Pin Configuration



## Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

| | |
|---|---|
| Storage Temperature | –65°C to +150°C |
| Ambient Temperature with Power Applied | –40°C to +85°C |
| Input Voltage Range, $V_{IN}$ | –0.5V to $V_{CC}$ +0.5V |
| Output Voltage Range, $V_{OUT}$ | –0.5V to $V_{CC}$ +0.5V |
| DC Input Voltage | –0.5V to +5.0V |
| DC Output Current | 100mA |
| Power Dissipation | 1.0W |

**Note:**
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

## DC Electrical Characteristics (Over the Operating Range, $T_A$ = –40°C to +85°C, $V_{CC}$ = 3.3V ±10%)

| Parameters | Description | Test Conditions(1) | Min. | Typ.(2) | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{CC}$ | Supply Voltage | | 2.3 | | 3.6 | V |
| $V_{IH}$(3) | Input HIGH Voltage | $V_{CC}$ = 2.3V to 2.7V | 1.7 | | | |
| | | $V_{CC}$ = 2.7V to 3.6V | 2.0 | | | |
| $V_{IL}$(3) | Input LOW Voltage | $V_{CC}$ = 2.3V to 2.7V | | | 0.7 | |
| | | $V_{CC}$ = 2.7V to 3.6V | | | 0.8 | |
| $V_{IN}$(3) | Input Voltage | | 0 | | $V_{CC}$ | |
| $V_{OUT}$(3) | Output Voltage | | 0 | | $V_{CC}$ | |
| $V_{OH}$ | Output HIGH Voltage | $I_{OH}$ = –100µA, $V_{CC}$ = Min. to Max. | $V_{CC}$ -0.2 | | | |
| | | $V_{IH}$ = 1.7V, $I_{OH}$ = –6mA, $V_{CC}$ = 2.3V | 2.0 | | | |
| | | $V_{IH}$ = 1.7V, $I_{OH}$ = –12mA, $V_{CC}$ = 2.3V | 1.7 | | | |
| | | $V_{IH}$ = 2.0V, $I_{OH}$ = –12mA, $V_{CC}$ = 2.7V | 2.2 | | | |
| | | $V_{IH}$ = 2.0V, $I_{OH}$ = –12mA, $V_{CC}$ = 3.0V | 2.4 | | | |
| | | $V_{IH}$ = 2.0V, $I_{OH}$ = –24mA, $V_{CC}$ = 3.0V | 2.0 | | | |
| $V_{OL}$ | Output LOW Voltage | $I_{OL}$ = 100µA, $V_{IL}$ = Min. to Max. | | | 0.2 | |
| | | $V_{IL}$ = 0.7V, $I_{OL}$ = 6mA, $V_{CC}$ = 2.3V | | | 0.4 | |
| | | $V_{IL}$ = 0.7V, $I_{OL}$ = 12mA, $V_{CC}$ = 2.3V | | | 0.7 | |
| | | $V_{IL}$ = 0.8V, $I_{OL}$ = 12mA, $V_{CC}$ = 2.7V | | | 0.4 | |
| | | $V_{IL}$ = 0.8V, $I_{OL}$ = 24mA, $V_{CC}$ = 3.0V | | | 0.55 | |
| $I_{OH}$(3) | Output HIGH Current | $V_{CC}$ = 2.3V | | | –12 | mA |
| | | $V_{CC}$ = 2.7V | | | –12 | |
| | | $V_{CC}$ = 3.0V | | | –24 | |
| $I_{OL}$(3) | Output LOW Current | $V_{CC}$ = 2.3V | | | 12 | |
| | | $V_{CC}$ = 2.7V | | | 12 | |
| | | $V_{CC}$ = 3.0V | | | 24 | |

## DC Electrical Characteristics-Continued (Over the Operating Range, $T_A$ = –40°C to +85°C, $V_{CC}$ = 3.3V ±10%)

| Parameters | Description | Test Conditions[1] | Min. | Typ.[2] | Max. | Units |
|---|---|---|---|---|---|---|
| $I_{IN}$ | Input Current | $V_{IN}$ = $V_{CC}$ or GND, $V_{CC}$ = 3.6V | | | ±5 | μA |
| $I_{IN}$ (HOLD) | Input Hold Current | $V_{IN}$ = 0.7V, $V_{CC}$ = 2.3V | 45 | | | |
| | | $V_{IN}$ = 1.7V, $V_{CC}$ = 2.3V | –45 | | | |
| | | $V_{IN}$ = 0.8V, $V_{CC}$ = 3.0V | 75 | | | |
| | | $V_{IN}$ = 2.0V, $V_{CC}$ = 3.0V | –75 | | | |
| | | $V_{IN}$ = 0 to 3.6V, $V_{CC}$ = 3.6V | | | ±500 | |
| $I_{OZ}$ | Output Current (3-State Outputs) | $V_{OUT}$ = $V_{CC}$ or GND, $V_{CC}$ = 3.6V | | | ±10 | |
| $I_{CC}$ | Supply Current | $V_{CC}$ = 3.6V, $I_{OUT}$ = 0μA, $V_{IN}$ = GND or $V_{CC}$ | | | 40 | |
| $\Delta I_{CC}$ | Supply Current per Input @ TTL HIGH | $V_{CC}$ = 3.0V to 3.6V One Input at $V_{CC}$ - 0.6V Other Inputs at $V_{CC}$ or GND | | | 750 | |
| $C_I$ | Control Inputs | $V_{IN}$ = $V_{CC}$ or GND, $V_{CC}$ = 3.3V | | 3 | | pF |
| | Data Inputs | | | 6 | | |
| $C_O$ | Outputs | $V_O$ = $V_{CC}$ or GND, $V_{CC}$ = 3.3V | | 7 | | |

**Notes:**
1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at $V_{CC}$ = 3.3V, +25°C ambient and maximum loading.
3. Unused Control Inputs must be held HIGH or LOW to prevent them from floating.

## Switching Characteristics over Operating Range[1]

| Parameters | From (INPUT) | To (OUTPUT) | $V_{CC}$ = 2.5V ± 0.2V | | $V_{CC}$ = 2.7V | | $V_{CC}$ = 3.3V ± 0.3V | | Units |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min.[2] | Max. | Min.[2] | Max. | Min.[2] | Max. | |
| $t_{PD}$ | A | Y | 1.0 | 3.7 | | 3.6 | 1.0 | 3.0 | ns |
| $t_{EN}$ | $\overline{OE}$ | Y | 1.0 | 5.7 | | 5.4 | 1.0 | 4.4 | |
| $t_{DIS}$ | $\overline{OE}$ | Y | 1.0 | 5.2 | | 4.6 | 1.0 | 4.1 | |
| | Description | | | | | | | | |
| $\Delta t/\Delta v$[3] | Input Transition Rise or Fall | | 0 | 10 | 0 | 10 | 0 | 10 | ns/V |

**Notes:**
1. See test circuit and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. Recommended operating condition.

## Operating Characteristics, $T_A$ = 25°C

| Parameter | | Test Conditions | $V_{CC}$ = 2.5V ± 0.2V | $V_{CC}$ = 3.3V ± 0.3V | Units |
|---|---|---|---|---|---|
| | | | Typical | | |
| $C_{PD}$ Power Dissipation Capacitance | Outputs Enabled | CL = 50pF f = 10 MHz | 16 | 19 | pF |
| | Outputs Disabled | | 4 | 5 | |