



# PI74FCT827T, PI74FCT828T (25Ω Series) PI74FCT2827T (25Ω Series) PI74FCT2828T

## Fast CMOS 10-Bit Buffers

### Product Features

- PI74FCT827/828/2827/2828T are pin compatible with bipolar FAST™ Series at a higher speed and lower power consumption
- 25Ω series resistor on all outputs (FCT2XXX only)
- TTL input and output levels
- Low ground bounce outputs
- Extremely low static power
- Hysteresis on all inputs
- Industrial operating temperature range: -40°C to +85°C
- Packages available:
  - 24-pin 300-mil wide plastic DIP (P)
  - 24-pin 150-mil wide plastic QSOP (Q)
  - 24-pin 150-mil wide plastic TQSOP (R)
  - 24-pin 300-mil wide plastic SOIC (S)

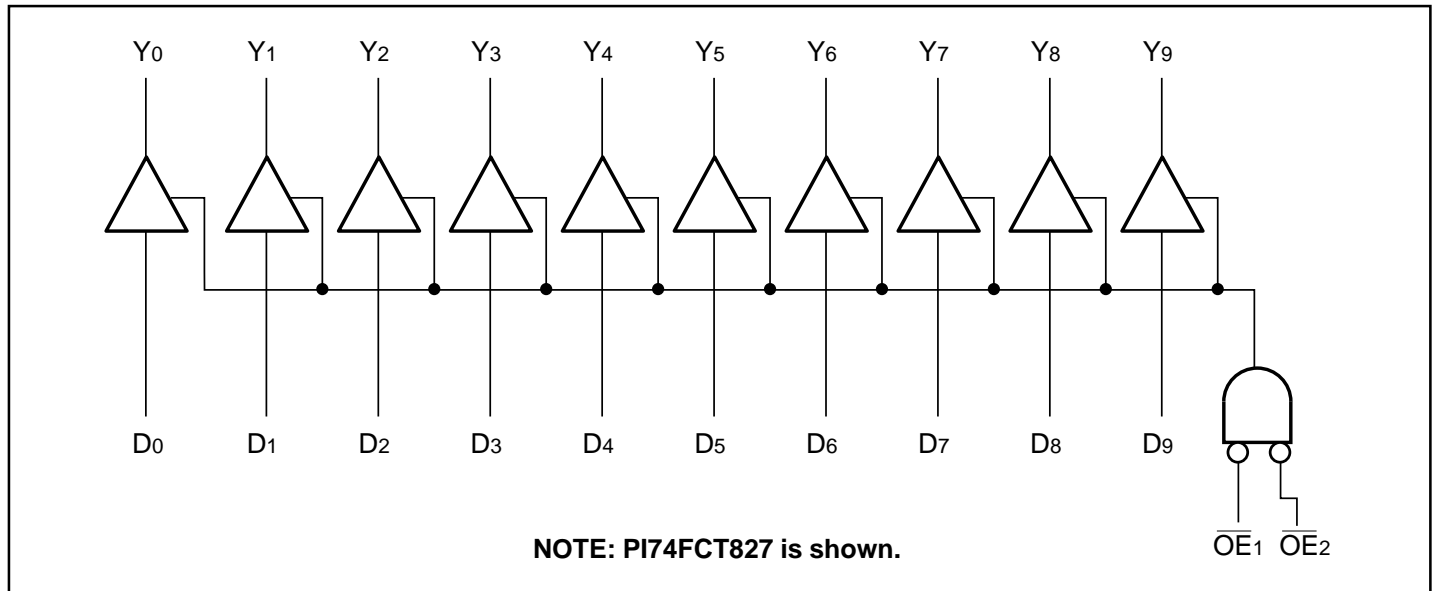
### Product Description

Pericom Semiconductor's PI74FCT series of logic circuits are produced in the Company's advanced 0.8 micron CMOS technology, achieving industry leading speed grades. All PI74FCT2XXX devices have a built-in 25-ohm series resistor on all outputs to reduce noise because of reflections, thus eliminating the need for an external terminating resistor.

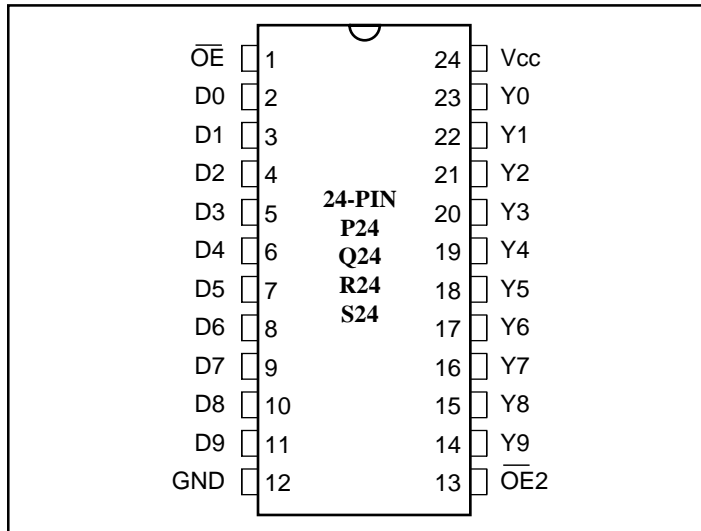
The PI74FCT827/828T and the PI74FCT2827/2828T are 10-bit wide bus drivers providing high-performance bus interface buffering for wide address/data paths or buses carrying parity. The 10-bit buffers have NAND-ed output enables for maximum control flexibility. They are designed for high-capacitance load drive capability, while providing low-capacitance bus loading at both inputs and outputs. The PI74FCT827/2827T is a non-inverting of the PI74FCT828/2828T.

Device models available upon request.

### Logic Block Diagram



### Product Pin Configuration



### Product Pin Description

| Pin Name          | Description                      |
|-------------------|----------------------------------|
| $\overline{OE}_N$ | Output Enable Input (Active LOW) |
| D0-D9             | 10-bit Data Inputs               |
| Y0-Y9             | 10-bit Data Outputs              |
| GND               | Ground                           |
| VCC               | Power                            |

### PI74FCT827/2827T Truth Table (Non-Inverting)<sup>(1)</sup>

| Function    | Inputs            |                   |                | Outputs        |
|-------------|-------------------|-------------------|----------------|----------------|
|             | $\overline{OE}_1$ | $\overline{OE}_2$ | D <sub>N</sub> | Y <sub>N</sub> |
| Transparent | L                 | L                 | L              | L              |
|             | L                 | L                 | H              | H              |
| Three-State | H                 | X                 | X              | Z              |
|             | X                 | H                 | X              | Z              |

### PI74FCT828/2828T Truth Table (Inverting)<sup>(1)</sup>

| Function    | Inputs            |                   |                | Outputs        |
|-------------|-------------------|-------------------|----------------|----------------|
|             | $\overline{OE}_1$ | $\overline{OE}_2$ | D <sub>N</sub> | Y <sub>N</sub> |
| Transparent | L                 | L                 | L              | H              |
|             | L                 | L                 | H              | L              |
| Three-State | H                 | X                 | X              | Z              |
|             | X                 | H                 | X              | Z              |

- H = High Voltage Level  
 L = Low Voltage Level  
 X = Don't Care  
 Z = High Impedance

### 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  |
| Supply Voltage to Ground Potential (Inputs & Vcc Only) .....  | -0.5V to +7.0V  |
| Supply Voltage to Ground Potential (Outputs & D/O Only) ..... | -0.5V to +7.0V  |
| DC Input Voltage .....  | -0.5V to +7.0V  |
| DC Output Current .....                                       | 120mA           |
| Power Dissipation .....                                       | 0.5W            |

**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, TA = -40°C to +85°C, VCC = 5.0V ± 5%)

| Parameters | Description           | Test Conditions <sup>(1)</sup>         |                         | Min. | Typ <sup>(2)</sup> | Max. | Units |
|------------|-----------------------|--|-------------------------|------|--------------------|------|-------|
| VOH        | Output HIGH Voltage   | VCC = Min., VIN = VIH or VIL           | IOH = -15.0mA           | 2.4  | 3.0                |      | V     |
| VOL        | Output LOW Current    | VCC = Min., VIN = VIH or VIL           | IOL = 48mA              |      | 0.3                | 0.50 | V     |
| VOL        | Output LOW Current    | VCC = Min., VIN = VIH or VIL           | IOL = 12mA (25Ω Series) |      | 0.3                | 0.50 | V     |
| VIH        | Input HIGH Voltage    | Guaranteed Logic HIGH Level            |                         | 2.0  |                    |      | V     |
| VIL        | Input LOW Voltage     | Guaranteed Logic LOW Level             |                         |      |                    | 0.8  | V     |
| IiH        | Input HIGH Current    | VCC = Max.                             | VIN = VCC               |      |                    | 1    | μA    |
| IiL        | Input LOW Current     | VCC = Max.                             | VIN = GND               |      |                    | -1   | μA    |
| IOZH       | High Impedance        | VCC = MAX.                             | VOUT = 2.7V             |      |                    | 1    | μA    |
| IOZL       | Output Current        |  | VOUT = 0.5V             |      |                    | -1   | μA    |
| Vik        | Clamp Diode Voltage   | VCC = Min., IIN = -18mA                |                         |      | -0.7               | -1.2 | V     |
| IOFF       | Power Down Disable    | VCC = GND, VOUT = 4.5V                 |                         | —    | —                  | 100  | μA    |
| Ios        | Short Circuit Current | VCC = Max. <sup>(3)</sup> , VOUT = GND |                         | -60  | -120               |      | mA    |
| VH         | Input Hysteresis      |  |                         |      | 200                |      | mV    |

### Capacitance (TA = 25°C, f = 1 MHz)

| Parameters <sup>(4)</sup> | Description        | Test Conditions | Typ | Max. | Units |
|---------------------------|--------------------|-----------------|-----|------|-------|
| CIN                       | Input Capacitance  | VIN = 0V        | 6   | 10   | pF    |
| COUT                      | Output Capacitance | VOUT = 0V       | 8   | 12   | pF    |

**Notes:**

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 5.0V, +25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. This parameter is determined by device characterization but is not production tested.

### Power Supply Characteristics

| Parameters       | Description                                     | Test Conditions <sup>(1)</sup>  |  | Min. | Typ <sup>(2)</sup> | Max.                | Units      |
|------------------|---|---|--|------|--------------------|---------------------|------------|
| I <sub>CC</sub>  | Quiescent Power Supply Current                  | V <sub>CC</sub> = Max.  | V <sub>IN</sub> = GND<br>or V <sub>CC</sub>                |      | 0.1                | 500                 | μA         |
| ΔI <sub>CC</sub> | Supply Current per Input @ TTL HIGH             | V <sub>CC</sub> = Max.  | V <sub>IN</sub> = 3.4V <sup>(3)</sup>                      |      | 0.5                | 2.0                 | mA         |
| I <sub>CCD</sub> | Supply Current per Input per MHz <sup>(4)</sup> | V <sub>CC</sub> = Max.,<br>Outputs Open<br>OE1 = OE2 = GND<br>One Input Toggling<br>50% Duty Cycle  | V <sub>IN</sub> = V <sub>CC</sub><br>V <sub>IN</sub> = GND |      | 0.15               | 0.25                | mA/<br>MHz |
| I <sub>C</sub>   | Total Power Supply Current <sup>(6)</sup>       | V <sub>CC</sub> = Max.,<br>Outputs Open<br>f <sub>CP</sub> = 10 MHz<br>50% Duty Cycle<br>OE1 = OE2 = GND<br>fi = 5 MHz<br>One Bit Toggling                        | V <sub>IN</sub> = V <sub>CC</sub><br>V <sub>IN</sub> = GND |      | 1.5                | 3.5 <sup>(5)</sup>  | mA         |
|                  |   |   | V <sub>IN</sub> = 3.4V<br>V <sub>IN</sub> = GND            |      | 1.8                | 4.5 <sup>(5)</sup>  |            |
|                  |   | V <sub>CC</sub> = Max.,<br>Outputs Open<br>f <sub>CP</sub> = 10 MHz<br>50% Duty Cycle<br>OE1 = OE2 = GND<br>Eight Bits Toggling<br>fi = 2.5 MHz<br>50% Duty Cycle | V <sub>IN</sub> = V <sub>CC</sub><br>V <sub>IN</sub> = GND |      | 3.0                | 6.0 <sup>(5)</sup>  |            |
|                  |   |   | V <sub>IN</sub> = 3.4V<br>V <sub>IN</sub> = GND            |      | 5.0                | 14.0 <sup>(5)</sup> |            |

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at V<sub>CC</sub> = 5.0V, +25°C ambient.
- Per TTL driven input (V<sub>IN</sub> = 3.4V); all other inputs at V<sub>CC</sub> or GND.
- This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
- Values for these conditions are examples of the I<sub>CC</sub> formula. These limits are guaranteed but not tested.
- I<sub>C</sub> = I<sub>QUIESCENT</sub> + I<sub>INPUTS</sub> + I<sub>DYNAMIC</sub>

$$I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_i N_i)$$

I<sub>CC</sub> = Quiescent Current

ΔI<sub>CC</sub> = Power Supply Current for a TTL High Input (V<sub>IN</sub> = 3.4V)

D<sub>H</sub> = Duty Cycle for TTL Inputs High

N<sub>T</sub> = Number of TTL Inputs at D<sub>H</sub>

I<sub>CCD</sub> = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)

f<sub>CP</sub> = Clock Frequency for Register Devices (Zero for Non-Register Devices)

f<sub>i</sub> = Input Frequency

N<sub>i</sub> = Number of Inputs at f<sub>i</sub>

All currents are in milliamps and all frequencies are in megahertz.

**PI74FCT827/2827T (non-inverting) Switching Characteristics over Operating Range**

| Parameters   | Description                                     | Conditions <sup>(1)</sup>              | 827AT/2827AT |      | 827BT/2827BT |      | 827CT/2827CT |      | 827DT |      | Units |
|--------------|---|--|--------------|------|--------------|------|--------------|------|-------|------|-------|
|              |   |  | Com.         |      | Com.         |      | Com.         |      | Com.  |      |       |
|              |   |  | Min.         | Max. | Min.         | Max. | Min.         | Max. | Min.  | Max. |       |
| tPLH<br>tPHL | Propagation Delay<br>DN to YN                   | CL = 50pF<br>RL = 500Ω                 | 1.5          | 6.5  | 1.5          | 5.0  | 1.5          | 4.4  | 1.5   | 3.8  | ns    |
|              |   | CL = 300pF <sup>(3)</sup><br>RL = 500Ω | 1.5          | 15.0 | 1.5          | 13.0 | 1.5          | 10.0 | 1.5   | 7.5  |       |
| tPZH<br>tPZL | Output Enable Time<br>OEN to YN                 | CL = 50pF<br>RL = 500Ω                 | 1.5          | 9.5  | 1.5          | 8.0  | 1.5          | 7.0  | 1.5   | 5.0  |       |
|              |   | CL = 300pF <sup>(3)</sup><br>RL = 500Ω | 1.5          | 23.0 | 1.5          | 15.0 | 1.5          | 14.0 | 1.5   | 9.0  |       |
| tPHZ<br>tPLZ | Output Disable Time <sup>(3)</sup><br>OEN to YN | CL = 5pF <sup>(3)</sup><br>RL = 500Ω   | 1.5          | 8.5  | 1.5          | 6.0  | 1.5          | 5.7  | 1.5   | 4.3  |       |
|              |   | CL = 50pF<br>RL = 500Ω                 | 1.5          | 10.0 | 1.5          | 7.0  | 1.5          | 6.0  | 1.5   | 4.3  |       |

**PI74FCT828/2828T (inverting) Switching Characteristics over Operating Range**

| Parameters   | Description                                     | Conditions <sup>(1)</sup>               | 828AT/2828AT |      | 828BT/2828BT |      | 828CT |      | Units |
|--------------|---|---|--------------|------|--------------|------|-------|------|-------|
|              |   |   | Com.         |      | Com.         |      | Com.  |      |       |
|              |   |   | Min.         | Max. | Min.         | Max. | Min.  | Max. |       |
| tPLH<br>tPHL | Propagation Delay<br>DN to YN                   | CL = 50 pF<br>RL = 500Ω                 | 1.5          | 6.5  | 1.5          | 5.5  | 1.5   | 4.4  | ns    |
|              |   | CL = 300 pF <sup>(3)</sup><br>RL = 500Ω | 1.5          | 15.0 | 1.5          | 13.0 | 1.5   | 10.0 | ns    |
| tPZH<br>tPZL | Output Enable Time<br>OEN to YN                 | CL = 50 pF<br>RL = 500Ω                 | 1.5          | 9.5  | 1.5          | 8.0  | 1.5   | 7.0  | ns    |
|              |   | CL = 300 pF <sup>(3)</sup><br>RL = 500Ω | 1.5          | 23.0 | 1.5          | 15.0 | 1.5   | 14.0 | ns    |
| tPHZ<br>tPLZ | Output Disable Time <sup>(3)</sup><br>OEN to YN | CL = 5 pF <sup>(3)</sup><br>RL = 500Ω   | 1.5          | 8.5  | 1.5          | 6.0  | 1.5   | 5.7  | ns    |
|              |   | CL = 50 pF<br>RL = 500Ω                 | 1.5          | 10.0 | 1.5          | 7.0  | 1.5   | 6.0  | ns    |

**Notes:**

1. See test circuit and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. This parameter is guaranteed but not production tested.