

**Product Features**

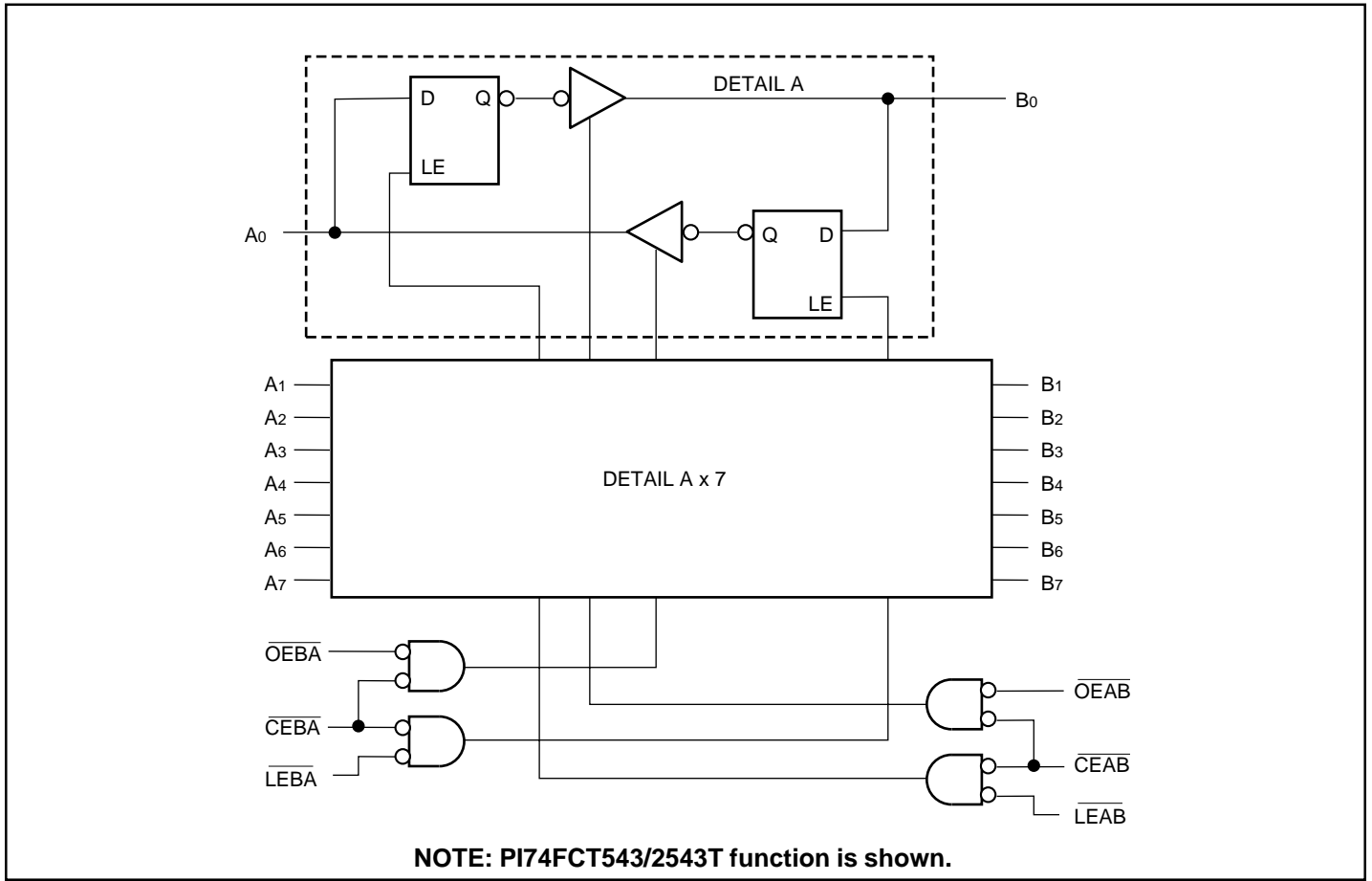
- PI74FCT543T/544/2543T is pin compatible with bipolar FAST™ Series at a higher speed and lower power consumption
- 25Ω series resistor on all outputs
- TTL input and output levels
- Low ground bounce outputs
- Extremely low static power
- Hysteresis on all inputs
- Industrial operating temperature range: -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)
- Device models available on request

**Product Description**

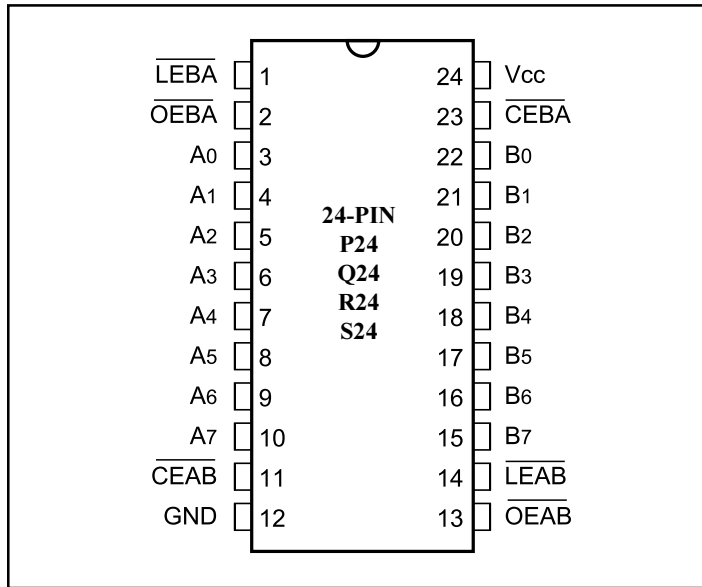
Pericom Semiconductor’s PI74FCT series of logic circuits are produced using the Company’s advanced 0.8 micron CMOS technology, achieving industry leading speed grades. All PI74FCT2XXX devices have a built-in 25 ohm series resistor on all outputs to reduce noise because of reflections, thus eliminating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

The PI74FCT543T/544T and PI74FCT2543T is an 8-bit wide non-inverting transceiver designed with two sets of eight D-type latches with separate input and output controls for each set. For data flow from A to B, for example, the A-to-B Enable ( $\overline{CEAB}$ ) input must be LOW in order to enter data from A0–A7 or to take data from B0–B7, as indicated in the Truth Table. With  $\overline{CEAB}$  LOW, a LOW signal makes the A-to-B latches transparent; a subsequent LOW-to-HIGH transition of the  $\overline{LEAB}$  signal puts the A latches in the storage mode and their outputs no longer change the A inputs. With  $\overline{CEAB}$  and  $\overline{OEAB}$  both LOW, the 3-state B output buffers are active and reflect the data present at the output of the A latches. Control of data from B to A is similar, but uses the  $\overline{CEAB}$ ,  $\overline{LEAB}$ , and  $\overline{OEAB}$  inputs. The PI74FCT543T is a non-inverting of the PI74FCT544T.

**PI74FCT543/544/2543T Logic Block Diagram**



### PI74FCT543/544/2543T Product Pin Configuration



### Product Pin Description

| Pin Name          | Description                                  |
|-------------------|--|
| $\overline{OEAB}$ | A-to-B Output Enable Input (Active LOW)      |
| $\overline{OEBA}$ | B-to-A Output Enable Input (Active LOW)      |
| $\overline{CEAB}$ | A-to-B Enable Input (Active LOW)             |
| $\overline{CEBA}$ | B-to-A Enable Input (Active LOW)             |
| $\overline{LEAB}$ | A-to-B Latch Enable Input (Active LOW)       |
| $\overline{LEBA}$ | B-to-A Latch Enable Input (Active LOW)       |
| A0-A7             | A-to-B Data Inputs or B-to-A 3-State Outputs |
| B0-B7             | B-to-A Data Inputs or A-to-B 3-State Outputs |
| GND               | Ground                                       |
| Vcc               | Power  |

### PI74FCT543/2543T Truth Table (Non-Inverting)<sup>(1,2)</sup> For A-to-B (Symmetric with B-to-A)

| Inputs            |                   |                   | Latch Status | Output Buffers     |
|-------------------|-------------------|-------------------|--------------|--------------------|
| $\overline{CEAB}$ | $\overline{LEAB}$ | $\overline{OEAB}$ | A-to-B       | B0-B7              |
| H                 | —                 | —                 | Storing      | High-Z             |
| —                 | H                 | —                 | Storing      | —                  |
| —                 | —                 | H                 | —            | High Z             |
| L                 | L                 | L                 | Transparent  | Current A Inputs   |
| L                 | H                 | L                 | Storing      | Previous* A Inputs |

- \*Before  $\overline{LEAB}$  LOW-to-HIGH Transition  
H = HIGH Voltage Level  
L = LOW Voltage Level  
— = Don't Care or Irrelevant
- A-to-B data flow shown; B-to-A flow control is the same, except using  $\overline{CEBA}$ ,  $\overline{LEBA}$ , and  $\overline{OEBA}$ .

### 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 .....                                       | 120 mA          |
| 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<br>IOH = -15.0 mA           | 2.4  | 3.0                |      | V     |
| VOL        | Output LOW Current    | VCC = Min., VIN = VIH or VIL<br>IOL = 64 mA              |      | 0.3                | 0.55 | V     |
| VOL        | Output LOW Current    | VCC = Min., VIN = VIH or VIL<br>IOL = 12 mA (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    | (Except I/O pins) VCC = Max.<br>VIN = VCC                |      |                    | 1    | μA    |
| IiL        | Input LOW Current     | (Except I/O pins) VCC = Max.<br>VIN = GND                |      |                    | -1   | μA    |
| IiH        | Input HIGH Current    | (I/O pins Only) VCC = Max.<br>VIN = VCC                  |      |                    | 1    | μA    |
| IiL        | Input LOW Current     | (I/O pins Only) VCC = Max.<br>VIN = GND                  |      |                    | -1   | μA    |
| IOZH       | High Impedance        | VCC = MAX.<br>VOUT = 2.7V                                |      |                    | 1    | μA    |
| IOZL       | Output Current        | VOUT = 0.5V  |      |                    | -1   | μA    |
| VIK        | Clamp Diode Voltage   | VCC = Min., IIN = -18 mA                                 |      | -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    |
| COU                       | 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 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>$\overline{CEAB}$ and $\overline{OEAB}$ = GND<br>$\overline{CEBA}$ = V <sub>CC</sub><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 (LEAB)<br>50% Duty Cycle<br>$\overline{CEAB}$ and $\overline{OEAB}$ = GND<br>$\overline{CEBA}$ = V <sub>CC</sub><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            |      | 2.0                | 5.5 <sup>(5)</sup>  |            |
|                  |   |  | V <sub>IN</sub> = V <sub>CC</sub><br>V <sub>IN</sub> = GND |      | 3.8                | 7.3 <sup>(5)</sup>  |            |
|                  |   |  | V <sub>IN</sub> = 3.4V<br>V <sub>IN</sub> = GND            |      | 6.0                | 16.3 <sup>(5)</sup> |            |

#### Notes:

- For conditions shown as Max. or Min., 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.

### PI74FCT543/2543T (non-inverting) Switching Characteristics over Operating Range

| Parameters   | Description   | Conditions <sup>(1)</sup> | 543T/2543T |      | 543AT/2543AT |     | 543CT/2543CT |     | 543DT |     | Unit |
|--------------|---|---------------------------|------------|------|--------------|-----|--------------|-----|-------|-----|------|
|              |   |                           | Com.       |      | Com.         |     | Com.         |     | Com.  |     |      |
|              |   |                           | Min        | Max  | Min          | Max | Min          | Max | Min   | Max |      |
| tPLH<br>tPHL | Propagation Delay Transparent Mode $\overline{A_N}$ to $\overline{B_N}$ or $\overline{B_N}$ to $\overline{A_N}$   | CL = 50 pF<br>RL = 500Ω   | 2.5        | 8.5  | 2.5          | 6.5 | 2.5          | 5.3 | 2.5   | 4.4 | ns   |
| tPLH<br>tPHL | Propagation Delay $\overline{LEBA}$ to $\overline{A_N}$ , $\overline{LEAB}$ to $\overline{B_N}$   |                           | 2.5        | 12.5 | 2.5          | 8.0 | 2.5          | 7.0 | 2.5   | 5.0 | ns   |
| tpZH<br>tpZL | Output Enable Time $\overline{OEBA}$ or $\overline{OEAB}$ to $\overline{A_N}$ or $\overline{B_N}$<br>$\overline{CEBA}$ or $\overline{CEAB}$ to $\overline{A_N}$ or $\overline{B_N}$                 |                           | 2.0        | 12.0 | 2.0          | 9.0 | 2.0          | 8.0 | 2.0   | 5.4 | ns   |
| tpZH<br>tpZL | Output Disable Time <sup>(3)</sup> $\overline{OEBA}$ or $\overline{OEAB}$ to $\overline{A_N}$ or $\overline{B_N}$<br>$\overline{CEBA}$ or $\overline{CEAB}$ to $\overline{A_N}$ or $\overline{B_N}$ |                           | 2.0        | 9.0  | 2.0          | 7.5 | 2.0          | 6.5 | 2.0   | 4.3 | ns   |
| tsu          | Setup Time, HIGH or LOW $\overline{A_N}$ or $\overline{B_N}$ to $\overline{LEBA}$ or $\overline{LEAB}$  |                           | 3.0        | —    | 2.0          | —   | 2.0          | —   | 1.5   | —   | ns   |
| th           | Hold Time, HIGH or LOW $\overline{A_N}$ or $\overline{B_N}$ to $\overline{LEBA}$ or $\overline{LEAB}$   |                           | 2.0        | —    | 2.0          | —   | 2.0          | —   | 1.5   | —   | ns   |
| tw           | $\overline{LEBA}$ or $\overline{LEAB}$ Pulse Width LOW <sup>(3)</sup>   |                           | 5.0        | —    | 5.0          | —   | 5.0          | —   | 3.0   | —   | ns   |

### PI74FCT544T (inverting) Switching Characteristics over Operating Range

| Parameters   | Description   | Conditions <sup>(1)</sup> | 544T |      | 544AT |     | 544CT |     | Unit |
|--------------|---|---------------------------|------|------|-------|-----|-------|-----|------|
|              |   |                           | Com. |      | Com.  |     | Com.  |     |      |
|              |   |                           | Min  | Max  | Min   | Max | Min   | Max |      |
| tPLH<br>tPHL | Propagation Delay Transparent Mode $\overline{A_N}$ to $\overline{B_N}$ or $\overline{B_N}$ to $\overline{A_N}$   | CL = 50 pF<br>RL = 500Ω   | 2.5  | 8.5  | 2.5   | 6.5 | 2.5   | 5.3 | ns   |
| tPLH<br>tPHL | Propagation Delay $\overline{LEBA}$ to $\overline{A_N}$ , $\overline{LEAB}$ to $\overline{B_N}$   |                           | 2.5  | 12.5 | 2.5   | 8.0 | 2.5   | 7.0 | ns   |
| tpZH<br>tpZL | Output Enable Time $\overline{OEBA}$ or $\overline{OEAB}$ to $\overline{A_N}$ or $\overline{B_N}$<br>$\overline{CEBA}$ or $\overline{CEAB}$ to $\overline{A_N}$ or $\overline{B_N}$                 |                           | 2.0  | 12.0 | 2.0   | 9.0 | 2.0   | 8.0 | ns   |
| tpZH<br>tpZL | Output Disable Time <sup>(3)</sup> $\overline{OEBA}$ or $\overline{OEAB}$ to $\overline{A_N}$ or $\overline{B_N}$<br>$\overline{CEBA}$ or $\overline{CEAB}$ to $\overline{A_N}$ or $\overline{B_N}$ |                           | 2.0  | 9.0  | 2.0   | 7.5 | 2.0   | 6.5 | ns   |
| tsu          | Setup Time, HIGH or LOW $\overline{A_N}$ or $\overline{B_N}$ to $\overline{LEBA}$ or $\overline{LEAB}$  |                           | 3.0  | —    | 2.0   | —   | 2.0   | —   | ns   |
| th           | Hold Time, HIGH or LOW $\overline{A_N}$ or $\overline{B_N}$ to $\overline{LEBA}$ or $\overline{LEAB}$   |                           | 2.0  | —    | 2.0   | —   | 2.0   | —   | ns   |
| tw           | $\overline{LEBA}$ or $\overline{LEAB}$ Pulse Width LOW <sup>(3)</sup>   |                           | 5.0  | —    | 5.0   | —   | 5.0   | —   | ns   |

**Notes:**

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