

Octal Transparent Latches

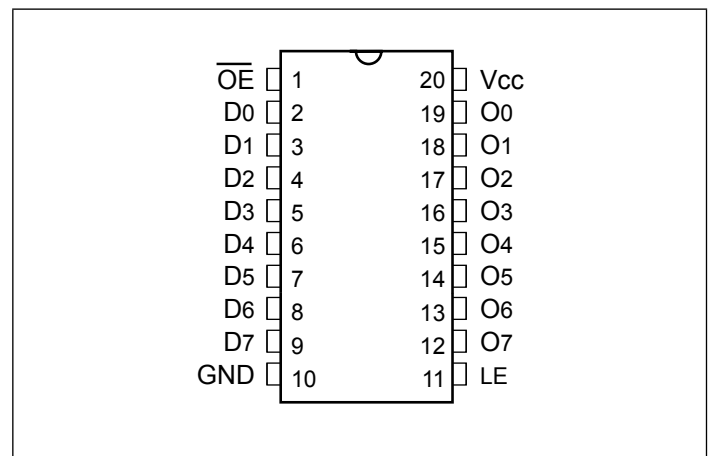
Features

- PI74FCT573T are pin compatible with bipolarFAST™ Series at a higher speed and lower power consumption
- TTL input and output levels
- Low ground bounce outputs
- Extremely low static power
- Hysteresis on all inputs
- Industrial operating temperature range: -40°C to $+85^{\circ}\text{C}$
- Packaging (Pb-free & Green):
 - 20-pin SOIC (S)

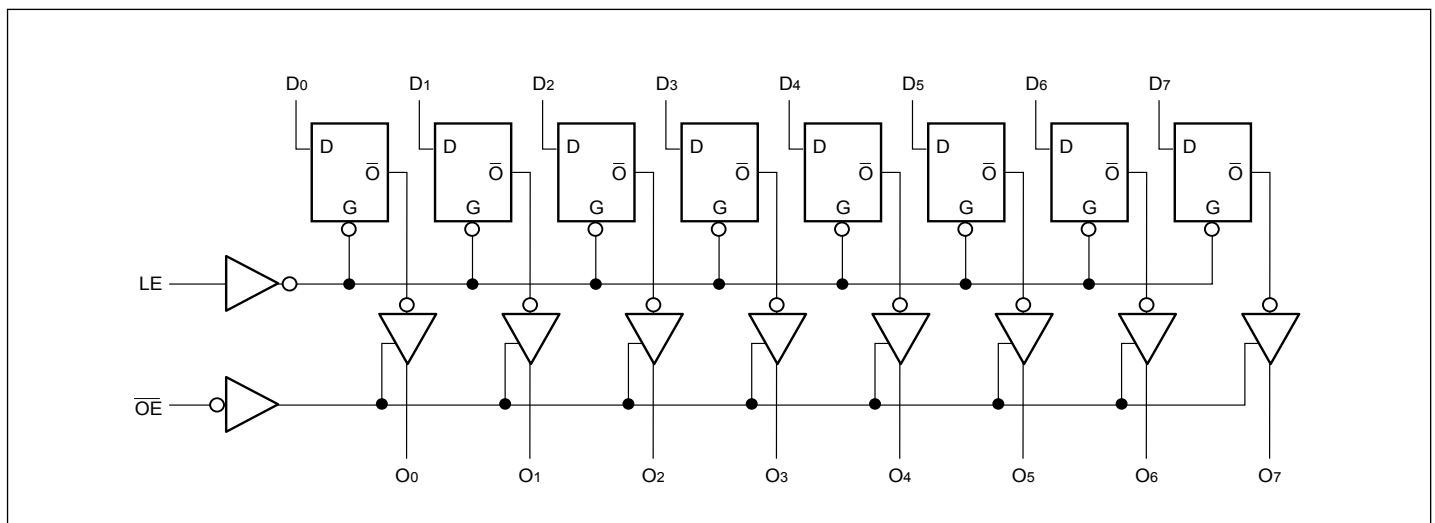
Description

Pericom Semiconductor's PI74FCT573T is an 8-bit wide octal transparent latches designed with 3-state outputs and are intended for bus oriented applications. When Latch Enable (LE) is HIGH, the flip-flops appear transparent to the data. The data that meets the set-up time when LE is LOW is latched. When $\overline{\text{OE}}$ is HIGH, the bus output is in the high impedance state.

Pin Configuration (20-Pin SOIC)



Block Diagram



Pinout Table

| Pin Name | Description |
|--------------------|----------------------------------|
| \overline{OE} | Output Enable Input (Active LOW) |
| LE | Latch Enable Input (Active HIGH) |
| D0-D7 | Data Inputs |
| O0-O7 | 3-State Outputs |
| $\overline{O0-O7}$ | Complementary 3-State Outputs |
| GND | Ground |
| V _{CC} | Power |

Truth Table⁽¹⁾

| Inputs | | | Outputs |
|----------------|----|-----------------|----------------|
| D _N | LE | \overline{OE} | O _N |
| H | H | L | H |
| L | H | L | L |
| X | X | H | Z |

Notes:

1. H = High Voltage Level, L = Low Voltage Level, X = Don't Care, Z = High Impedance

Absolute Maximum Ratings (Over operating free-air temperature range)

| Parameter | Min. | Max. | Units |
|--|------|------|-------|
| Storage temperature | -65 | 150 | °C |
| Ambient Temperature with Power Applied | -40 | 85 | °C |
| Supply Voltage to Ground Potential (Inputs & V _{CC} Only) | -0.5 | 7.0 | V |
| Supply Voltage to Ground Potential (Outputs & D/O Only) | -0.5 | 7.0 | V |
| DC Input Voltage | -0.5 | 7.0 | V |
| DC Output Current | - | 120 | mA |
| Power Dissipation | - | 0.5 | W |

Stress beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

DC Electrical Characteristics (Over the Operating Range, $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $V_{CC} = 5.0\text{V} \pm 5\%$)

| Parameters | Description | Test Conditions ⁽¹⁾ | | Min | Typ ⁽²⁾ | Max | Units |
|------------------------|-------------------------------|--|-----------------------------|-----|--------------------|------|---------------|
| V_{OH} | Output HIGH Voltage | $V_{CC} = \text{Min.}, V_{IN} = V_{IH} \text{ or } V_{IL}$ | $I_{OH} = -15.0 \text{ mA}$ | 2.4 | 3.0 | | V |
| V_{OL} | Output LOW Voltage | $V_{CC} = \text{Min.}, V_{IN} = V_{IH} \text{ or } V_{IL}$ | $I_{OL} = 64 \text{ mA}$ | | 0.3 | 0.55 | |
| V_{IH} | Input HIGH Voltage | Guaranteed Logic HIGH Level | | 20 | | | |
| V_{IL} | Input LOW Voltage | Guaranteed Logic LOW Level | | | | 0.8 | |
| I_{IH} | Input HIGH Current | $V_{CC} = \text{Max.}$ | $V_{IN} = V_{CC}$ | | | 1 | μA |
| I_{IL} | Input LOW Current | $V_{CC} = \text{Max.}$ | $V_{IN} = \text{GND}$ | | | -1 | |
| I_{OZH} I_{OZL} | High Impedance Output Current | $V_{CC} = \text{Max.}$ | $V_{OUT} = 2.7\text{V}$ | | | 1 | |
| | | | $V_{OUT} = 0.5\text{V}$ | | | | |
| V_{IK} | Clamp Diode Voltage | $V_{CC} = \text{Min.}, I_{IN} = -18 \text{ mA}$ | | | -0.7 | -1.2 | V |
| I_{OFF} | Power Down Disable | $V_{CC} = \text{GND}, V_{OUT} = 4.5\text{V}$ | | | | 100 | μA |
| I_{OS} | Short Circuit Current | $V_{CC} = \text{Max.}(3), V_{OUT} = \text{GND}$ | | -60 | -120 | | mA |
| V_H | Input Hysteresis | | | | 200 | | mV |

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at $V_{CC} = 5.0\text{V}$, $+25^{\circ}\text{C}$ 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.

Capacitance ($T_A = 25^{\circ}\text{C}$, $f = 1 \text{ MHz}$)

| Parameters ⁽³⁾ | Description | Test Conditions | Typ | Max | Units |
|---------------------------|--------------------|-----------------------|-----|-----|-------|
| C_{IN} | Input Capacitance | $V_{IN} = 0\text{V}$ | 6 | 10 | pF |
| C_{OUT} | Output Capacitance | $V_{OUT} = 0\text{V}$ | 8 | 12 | |

Notes:

1. This parameter is determined by device characterization but is not production tested.

Power Supply Characteristics

| Parameters | Description | Test Conditions ⁽¹⁾ | | Min | Typ ⁽²⁾ | Max | Units |
|------------------|---|---|--|-----|--------------------|---------------------|------------|
| I _{CC} | Quiescent Power Supply Current | V _{CC} = Max. | V _{IN} = GND or V _{CC} | | 0.1 | 500 | μA |
| ΔI _{CC} | Supply Current per Input @ TTL HIGH | | V _{IN} = 3V ⁽³⁾ | | 0.5 | 2.0 | mA |
| I _{CCD} | Supply Current per Input per MHz ⁽⁴⁾ | V _{CC} = Max., Outputs Open, \overline{OE} = GND, LE = V _{CC} One Bit Toggling, 50% Duty Cycle | V _{IN} = V _{CC} , V _{IN} = GND | | 0.15 | 0.25 | mA/ MHz |
| I _C | Total Power Supply Current ⁽⁶⁾ | V _{CC} = Max., Outputs Open, f _I = 10MHz, 50% Duty Cycle, \overline{OE} = GND, LE = V _{CC} , One Bit Toggling | V _{IN} = V _{CC} , V _{IN} = GND | | 1.5 | 3.0 ⁽⁵⁾ | mA |
| | | | V _{IN} = V _{CC} , V _{IN} = GND | | 1.8 | 4.5 ⁽⁵⁾ | |
| | | V _{CC} = Max., Outputs Open, f _I = 2.5MHz, 50% Duty Cycle, \overline{OE} = GND, LE = V _{CC} , Eight Bit Toggling | V _{IN} = V _{CC} , V _{IN} = GND | | 3.0 | 6.0 ⁽⁵⁾ | |
| | | | V _{IN} = V _{CC} , V _{IN} = GND | | 5.0 | 14.0 ⁽⁵⁾ | |

Notes:

- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at V_{CC} = 5.0V, +25°C ambient.
- Per TTL driven input (V_{IN} = 3.4V); all other inputs at V_{CC} 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_{CC} formula. These limits are guaranteed but not tested.

$$6. I_C = I_{\text{QUIESCENT}} + I_{\text{INPUTS}} + I_{\text{DYNAMIC}}$$

$$I_C = I_{CC} + \Delta I_{CC} \cdot D_H \cdot N_T + I_{CCD} (f_{CP/2} + f_I \cdot N_I)$$

$$I_{CC} = \text{Quiescent Current}$$

$$\Delta I_{CC} = \text{Power Supply Current for a TTL High Input (V}_{IN} = 3.4V)$$

$$D_H = \text{Duty Cycle for TTL Inputs High}$$

$$N_T = \text{Number of TTL Inputs at } D_H$$

$$I_{CCD} = \text{Dynamic Current Caused by an Input Transition Pair (HLH or LHL)}$$

$$f_{CP} = \text{Clock Frequency for Register Devices (Zero for Non-Register Devices)}$$

$$f_I = \text{Input Frequency}$$

$$N_I = \text{Number of Inputs at } f_I$$

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

Switching Characteristics over Operating Range

| Parameters | Description | Test Conditions | 573T | | 573AT | | 573CT | | 573DT | | Units |
|--------------------------------------|--|---|------|------|-------|-----|-------|-----|-------|-----|-------|
| | | | Com. | | Com. | | Com. | | Com. | | |
| | | | Min | Max | Min | Max | Min | Max | Min | Max | |
| t _{PLH} t _{PHL} | Propagation Delay ⁽¹⁾ D _N to O _N | C _L = 50 pF R _L = 500Ω | 15 | 8.0 | 15 | 5.2 | 15 | 4.2 | 15 | 3.8 | ns |
| t _{PLH} t _{PHL} | Propagation Delay ⁽¹⁾ LE to O _N | | 2.0 | 12.0 | 2.0 | 8.5 | 2.0 | 5.5 | 2.0 | 4.9 | |
| t _{PZH} t _{PZL} | Output Enable Time OE to O _N | | 1.5 | 9.5 | 1.5 | 6.5 | 1.5 | 5.5 | 1.5 | 5.5 | |
| t _{PHZ} t _{PLZ} | Output Enable Time ⁽²⁾ OE to O _N | | 1.5 | 6.5 | 1.5 | 5.5 | 1.5 | 5.0 | 1.5 | 5.0 | |
| t _{SU} | Setup Time HIGH or LOW, D _N to LE | | 20 | | 20 | | 20 | | 20 | | |
| t _H | Hold Time HIGH or LOW, D _N to LE | | 1.5 | | 1.5 | | 1.5 | | 1.0 | | |
| t _W | LE Pulse Width ⁽²⁾ HIGH | | 6.0 | | 5.0 | | 5.0 | | 3.0 | | |

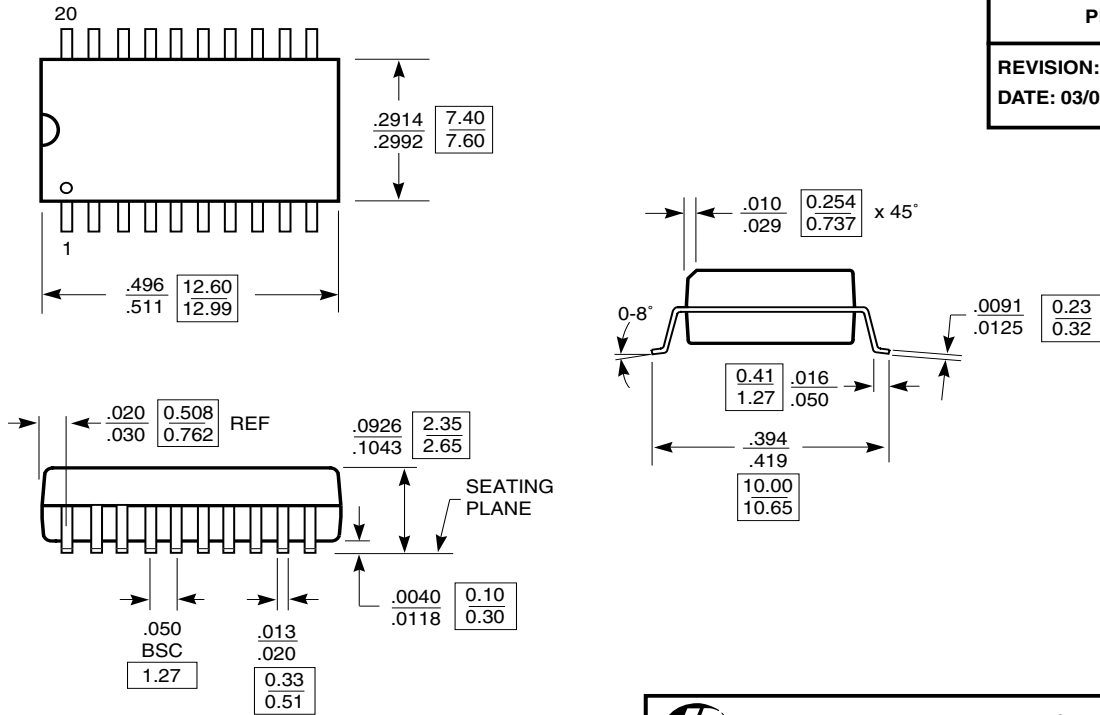
Notes:

1. Minimum limits are guaranteed but not tested on Propagation Delays.
2. This parameter guaranteed but not production tested.

Packaging Mechanical: 20-Pin SOIC (S)

DOCUMENT CONTROL NO.
PD - 1006

REVISION: D
DATE: 03/09/05



X.XX DENOTES CONTROLLING
X.XX DIMENSIONS IN MILLIMETERS

Notes:
1) Controlling dimensions in millimeters.
2) Ref: JEDEC MS-013D/AC



Pericom Semiconductor Corporation
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1-800-435-2335 • www.pericom.com

DESCRIPTION: 20-Pin, 300-Mil Wide, SOIC

PACKAGE CODE: S

Ordering Information

| Ordering Code | Package Code | Speed Grade | Package Type |
|----------------|--------------|-------------|------------------------------|
| PI74FCT573ATSE | S | A | Pb-free & Green, 20-pin SOIC |

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
2. E = Pb-free & Green
3. Adding an X suffix = Tape/Reel