

## 74F573

### Octal D-Type Latch with 3-STATE Outputs

#### General Description

The 74F573 is a high speed octal latch with buffered common Latch Enable (LE) and buffered common Output Enable ( $\overline{OE}$ ) inputs.

This device is functionally identical to the 74F373 but has different pinouts.

#### Features

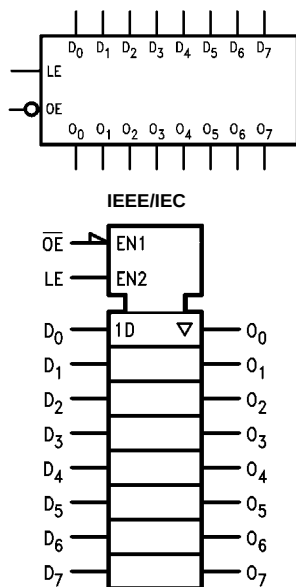
- Inputs and outputs on opposite sides of package allowing easy interface with microprocessors
- Useful as input or output port for microprocessors
- Functionally identical to 74F373
- 3-STATE outputs for bus interfacing
- Guaranteed 4000V minimum ESD protection

#### Ordering Code:

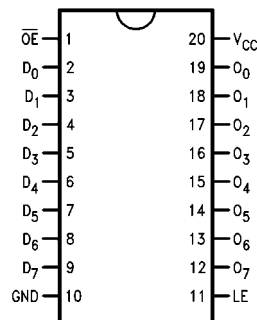
| Order Number | Package Number | Package Description                                                       |
|--------------|----------------|---------------------------------------------------------------------------|
| 74F573SC     | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| 74F573SJ     | M20D           | 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide             |
| 74F573PC     | N20A           | 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide     |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

#### Logic Symbols



#### Connection Diagram



### Unit Loading/Fan Out

| Pin Names                      | Description                              | U.L.<br>HIGH/LOW | Input $I_{IH}/I_{IL}$<br>Output $I_{OH}/I_{OL}$ |
|--------------------------------|------------------------------------------|------------------|-------------------------------------------------|
| D <sub>0</sub> –D <sub>7</sub> | Data Inputs                              | 1.0/1.0          | 20 $\mu$ A/–0.6 mA                              |
| LE                             | Latch Enable Input (Active HIGH)         | 1.0/1.0          | 20 $\mu$ A/–0.6 mA                              |
| $\overline{OE}$                | 3-STATE Output Enable Input (Active LOW) | 1.0/1.0          | 20 $\mu$ A/–0.6 mA                              |
| O <sub>0</sub> –O <sub>7</sub> | 3-STATE Latch Outputs                    | 150/40(33.3)     | –3 mA/24 mA (20 mA)                             |

### Functional Description

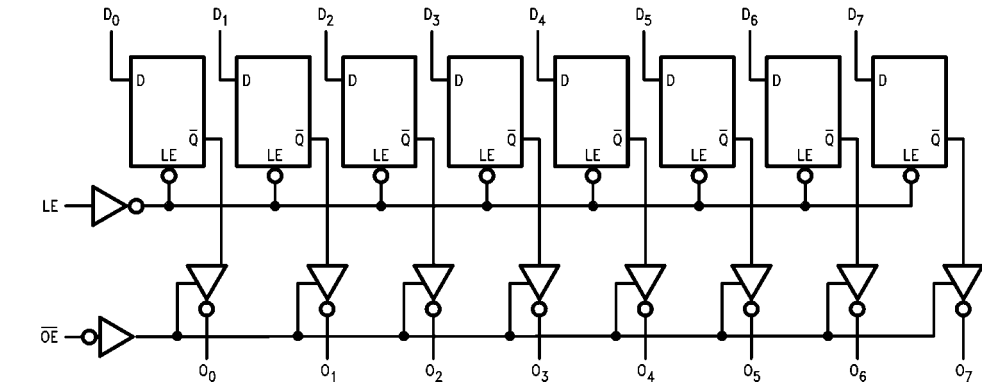
The 74F573 contains eight D-type latches with 3-state output buffers. When the Latch Enable (LE) input is HIGH, data on the D<sub>n</sub> inputs enters the latches. In this condition the latches are transparent, i.e., a latch output will change state each time its D input changes. When LE is LOW the latches store the information that was present on the D inputs a setup time preceding the HIGH-to-LOW transition of LE. The 3-state buffers are controlled by the Output Enable ( $\overline{OE}$ ) input. When  $\overline{OE}$  is LOW, the buffers are in the bi-state mode. When  $\overline{OE}$  is HIGH the buffers are in the high impedance mode but this does not interfere with entering new data into the latches.

### Function Table

| Inputs          |    |   | Outputs        |
|-----------------|----|---|----------------|
| $\overline{OE}$ | LE | D | O              |
| L               | H  | H | H              |
| L               | H  | L | L              |
| L               | L  | X | O <sub>0</sub> |
| H               | X  | X | Z              |

H = HIGH Voltage Level  
 L = LOW Voltage Level  
 X = Immaterial  
 O<sub>0</sub> = Value stored from previous clock cycle

### Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

**Absolute Maximum Ratings**(Note 1)

|                                                                        |                                      |
|------------------------------------------------------------------------|--------------------------------------|
| Storage Temperature                                                    | −65°C to +150°C                      |
| Ambient Temperature under Bias                                         | −55°C to +125°C                      |
| Junction Temperature under Bias                                        | −55°C to +150°C                      |
| V <sub>CC</sub> Pin Potential to Ground Pin                            | −0.5V to +7.0V                       |
| Input Voltage (Note 2)                                                 | −0.5V to +7.0V                       |
| Input Current (Note 2)                                                 | −30 mA to +5.0 mA                    |
| Voltage Applied to Output<br>in HIGH State (with V <sub>CC</sub> = 0V) |                                      |
| Standard Output                                                        | −0.5V to V <sub>CC</sub>             |
| 3-STATE Output                                                         | −0.5V to +5.5V                       |
| Current Applied to Output<br>in LOW State (Max)                        | twice the rated I <sub>OL</sub> (mA) |
| ESD Last Passing Voltage (Min)                                         | 4000V                                |

**Recommended Operating Conditions**

|                              |                |
|------------------------------|----------------|
| Free Air Ambient Temperature | 0°C to +70°C   |
| Supply Voltage               | +4.5V to +5.5V |

**Note 1:** Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

**Note 2:** Either voltage limit or current limit is sufficient to protect inputs.

**DC Electrical Characteristics**

| Symbol           | Parameter                         | Min                                                                                    | Typ                      | Max         | Units | V <sub>CC</sub> | Conditions                                                                                               |
|------------------|-----------------------------------|----------------------------------------------------------------------------------------|--------------------------|-------------|-------|-----------------|----------------------------------------------------------------------------------------------------------|
| V <sub>IH</sub>  | Input HIGH Voltage                | 2.0                                                                                    |                          |             | V     |                 | Recognized as a HIGH Signal                                                                              |
| V <sub>IL</sub>  | Input LOW Voltage                 |                                                                                        |                          | 0.8         | V     |                 | Recognized as a LOW Signal                                                                               |
| V <sub>CD</sub>  | Input Clamp Diode Voltage         |                                                                                        |                          | −1.2        | V     | Min             | I <sub>IN</sub> = −18 mA                                                                                 |
| V <sub>OH</sub>  | Output HIGH Voltage               | 10% V <sub>CC</sub><br>10% V <sub>CC</sub><br>5% V <sub>CC</sub><br>5% V <sub>CC</sub> | 2.5<br>2.4<br>2.7<br>2.7 |             | V     | Min             | I <sub>OH</sub> = −1 mA<br>I <sub>OH</sub> = −3 mA<br>I <sub>OH</sub> = −1 mA<br>I <sub>OH</sub> = −3 mA |
| V <sub>OL</sub>  | Output LOW Voltage                | 10% V <sub>CC</sub>                                                                    |                          | 0.5         | V     | Min             | I <sub>OL</sub> = 24 mA                                                                                  |
| I <sub>IH</sub>  | Input HIGH Current                |                                                                                        |                          | 20.0<br>5.0 | μA    | Max             | V <sub>IN</sub> = 2.7V                                                                                   |
| I <sub>BVI</sub> | Input HIGH Current Breakdown Test |                                                                                        |                          | 7.0         | μA    | Max             | V <sub>IN</sub> = 7.0V                                                                                   |
| I <sub>CEX</sub> | Output HIGH Leakage Current       |                                                                                        |                          | 50          | μA    | Max             | V <sub>OUT</sub> = V <sub>CC</sub>                                                                       |
| V <sub>ID</sub>  | Input Leakage Test                | 4.75                                                                                   |                          |             | V     | 0.0             | I <sub>ID</sub> = 1.9 μA<br>All Other Pins Grounded                                                      |
| I <sub>OD</sub>  | Output Leakage Circuit Current    |                                                                                        |                          | 3.75        | μA    | 0.0             | V <sub>IOD</sub> = 150 mV<br>All Other Pins Grounded                                                     |
| I <sub>IL</sub>  | Input LOW Current                 |                                                                                        |                          | −0.6        | mA    | Max             | V <sub>IN</sub> = 0.5V                                                                                   |
| I <sub>OZH</sub> | Output Leakage Current            |                                                                                        |                          | 50          | μA    | Max             | V <sub>OUT</sub> = 2.7V                                                                                  |
| I <sub>OZL</sub> | Output Leakage Current            |                                                                                        |                          | −50         | μA    | Max             | V <sub>OUT</sub> = 0.5V                                                                                  |
| I <sub>OS</sub>  | Output Short-Circuit Current      | −60                                                                                    |                          | −150        | mA    | Max             | V <sub>OUT</sub> = 0V                                                                                    |
| I <sub>ZZ</sub>  | Bus Drainage Test                 |                                                                                        |                          | 500         | μA    | 0.0V            | V <sub>OUT</sub> = 5.25V                                                                                 |
| I <sub>CCL</sub> | Power Supply Current              |                                                                                        | 35                       | 55          | mA    | Max             | V <sub>O</sub> = LOW                                                                                     |
| I <sub>CCZ</sub> | Power Supply Current              |                                                                                        | 35                       | 55          | mA    | Max             | V <sub>O</sub> = HIGH Z                                                                                  |

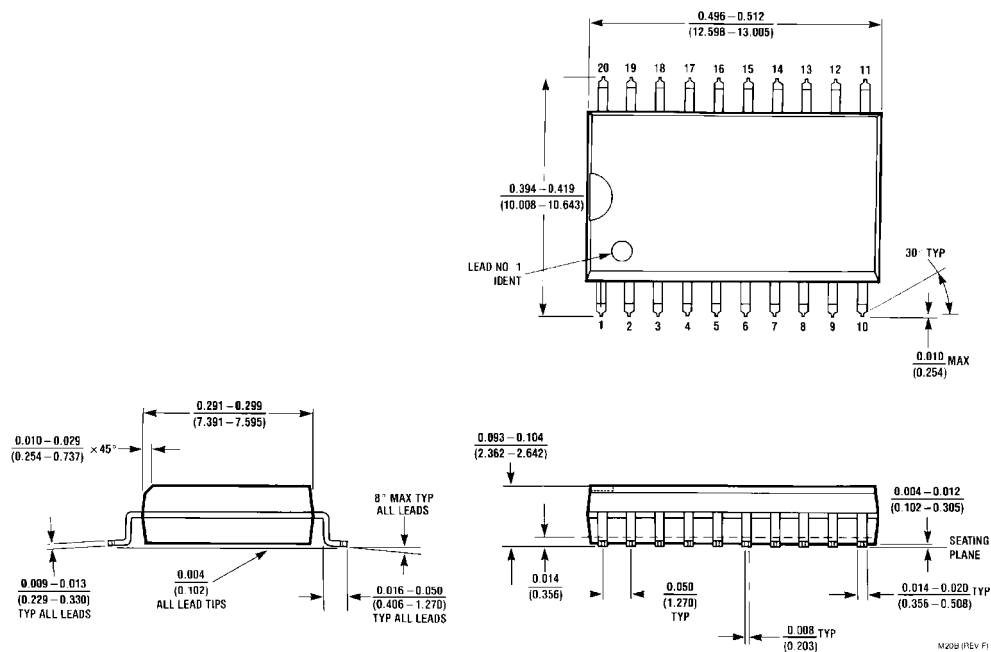
## AC Electrical Characteristics

| Symbol           | Parameter                        | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |     |      | T <sub>A</sub> = -55°C to +125°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |      | T <sub>A</sub> = 0°C to +70°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |      | Units |
|------------------|----------------------------------|-----------------------------------------------------------------------------|-----|------|---------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------|------|-------|
|                  |                                  | Min                                                                         | Typ | Max  | Min                                                                                   | Max  | Min                                                                                | Max  |       |
| t <sub>PLH</sub> | Propagation Delay                | 3.0                                                                         | 5.3 | 7.0  | 3.0                                                                                   | 9.0  | 3.0                                                                                | 8.0  | ns    |
| t <sub>PHL</sub> | D <sub>n</sub> to O <sub>n</sub> | 2.0                                                                         | 3.7 | 6.0  | 2.0                                                                                   | 7.0  | 2.0                                                                                | 6.5  |       |
| t <sub>PLH</sub> | Propagation Delay                | 5.0                                                                         | 9.0 | 11.0 | 5.0                                                                                   | 13.5 | 5.0                                                                                | 12.0 | ns    |
| t <sub>PHL</sub> | LE to O <sub>n</sub>             | 3.0                                                                         | 5.2 | 7.0  | 3.0                                                                                   | 7.5  | 3.0                                                                                | 7.0  |       |
| t <sub>PZH</sub> | Output Enable Time               | 2.0                                                                         | 5.0 | 8.0  | 2.0                                                                                   | 10.0 | 2.0                                                                                | 9.0  | ns    |
| t <sub>PZL</sub> |                                  | 2.0                                                                         | 5.6 | 8.5  | 2.0                                                                                   | 10.0 | 2.0                                                                                | 9.5  |       |
| t <sub>PHZ</sub> | Output Disable Time              | 1.5                                                                         | 4.5 | 5.5  | 1.5                                                                                   | 7.0  | 1.5                                                                                | 6.5  |       |
| t <sub>PLZ</sub> |                                  | 1.5                                                                         | 3.8 | 5.5  | 1.5                                                                                   | 5.5  | 1.5                                                                                | 5.5  |       |

## AC Operating Requirements

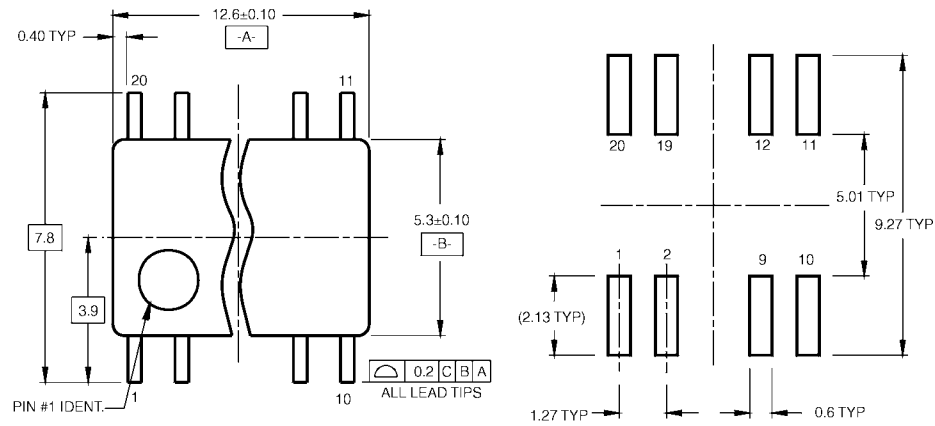
| Symbol             | Parameter               | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0V |     | T <sub>A</sub> = -55°C to +125°C<br>V <sub>CC</sub> = +5.0V |     | T <sub>A</sub> = 0°C to +70°C<br>V <sub>CC</sub> = +5.0V |     | Units |
|--------------------|-------------------------|---------------------------------------------------|-----|-------------------------------------------------------------|-----|----------------------------------------------------------|-----|-------|
|                    |                         | Min                                               | Max | Min                                                         | Max | Min                                                      | Max |       |
| t <sub>S</sub> (H) | Setup Time, HIGH or LOW | 2.0                                               |     | 2.0                                                         |     | 2.0                                                      |     | ns    |
| t <sub>S</sub> (L) | D <sub>n</sub> to LE    | 2.0                                               |     | 2.0                                                         |     | 2.0                                                      |     |       |
| t <sub>H</sub> (H) | Hold Time, HIGH or LOW  | 3.0                                               |     | 3.0                                                         |     | 3.0                                                      |     |       |
| t <sub>H</sub> (L) | D <sub>n</sub> to LE    | 3.5                                               |     | 4.0                                                         |     | 3.5                                                      |     | ns    |
| t <sub>W</sub> (H) | LE Pulse Width, HIGH    | 4.0                                               |     | 4.0                                                         |     | 4.0                                                      |     |       |

# Physical Dimensions inches (millimeters) unless otherwise noted

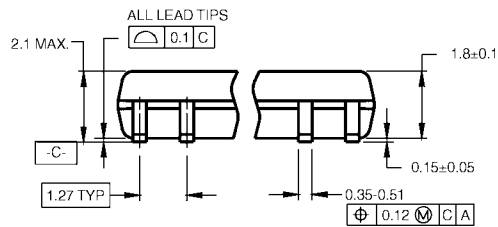


**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide  
Package Number M20B**

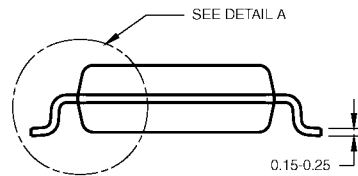
# Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



LAND PATTERN RECOMMENDATION



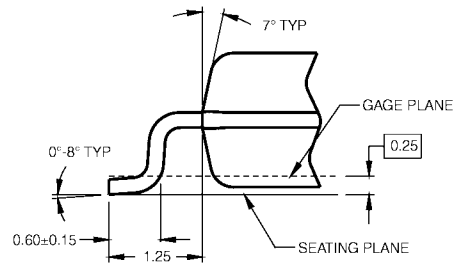
DIMENSIONS ARE IN MILLIMETERS



## NOTES:

- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M20DRevB1



DETAIL A

**20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide  
Package Number M20D**

