

## 74FR573 Octal D-Type Latch with 3-STATE Outputs

### General Description

The 74FR573 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 74F573.

### Features

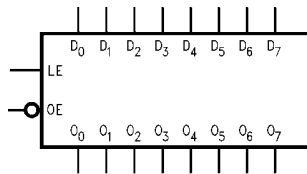
- Broadside pinout aids in PC layout
- Functionally identical to the 74F373, 74F573
- Outputs have current sourcing capability of 15 mA and current sinking capability of 64 mA
- Guaranteed pin-to-pin skew

### Ordering Code:

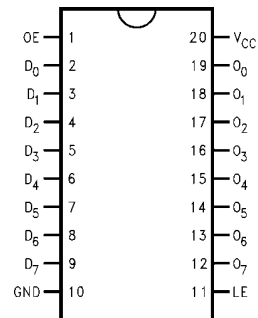
Order Number	Package Number	Package Description
74FR573SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
74FR573PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

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

### Logic Symbol



### Connection Diagram



### Pin Descriptions

Pin Names	Description
$\overline{OE}$	Output Enable Input (Active-LOW)
LE	Latch Enable Input (Active-HIGH)
D <sub>0</sub> -D <sub>7</sub>	Data Inputs
O <sub>0</sub> -O <sub>7</sub>	3-STATE Latch Outputs

## Functional Description

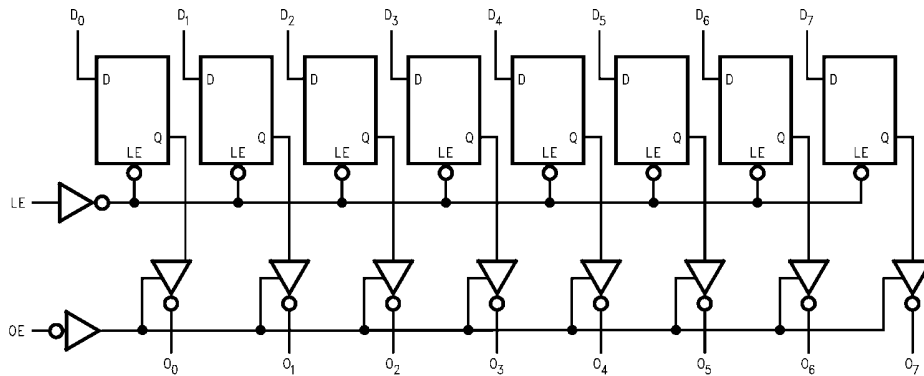
The 74FR573 contains eight D-type latches with 3-STATE output buffers. When the latch enable (LE) input is HIGH, data on the  $D_n$  inputs enters the latches. In this condition the latches are transparent, i.e., a latch output will change state each time its D input changes. When LE is LOW the latches 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			Output
$\overline{OE}$	LE	$D_n$	$O_n$
L	H	H	H
L	H	L	L
L	L	X	$O_{n-1}$
H	X	X	High Z State

H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial

## Logic Diagram



**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° 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 in HIGH State (with V <sub>CC</sub> = 0V)	
Standard Output	-0.5V to V <sub>CC</sub>
3-STATE Output	-0.5 to +5.5V
Current Applied to Output 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 HIGH Signal
V <sub>IL</sub>	Input LOW Voltage			0.8	V		Recognized 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	2.4			V	Min	I <sub>OH</sub> = -3 mA
		2.0			V	Min	I <sub>OH</sub> = -15 mA
V <sub>OL</sub>	Output LOW Voltage			0.55	V	Min	I <sub>OL</sub> = 64 mA
I <sub>IH</sub>	Input HIGH Current			5	μA	Max	V <sub>IN</sub> = 2.7V
I <sub>BVI</sub>	Input HIGH Current Breakdown Test			7	μA	Max	V <sub>IN</sub> = 7.0V
I <sub>IL</sub>	Input LOW Current			-150	μA	Max	V <sub>IN</sub> = 0.5V Data Inputs
				-100	μA	Max	V <sub>IN</sub> = 0.5V Control Inputs
V <sub>ID</sub>	Input Leakage Test	4.75			V	0.0	I <sub>ID</sub> = 1.9 μA, All Other Pins Grounded
I <sub>OD</sub>	Output Circuit Leakage Current			3.75	μA	0.0	μA <sub>I<sub>OD</sub></sub> = 150 mV, All Other Pins Grounded
I <sub>OZH</sub>	Output Leakage Current			20	μA	Max	V <sub>OUT</sub> = 2.7V
I <sub>OZL</sub>	Output Leakage Current			-20	μA	Max	V <sub>OUT</sub> = 0.5V
I <sub>OS</sub>	Output Short-Circuit Current	-100		-225	mA	Max	V <sub>OUT</sub> = 0.0V
I <sub>CEX</sub>	Output HIGH Leakage Current			50	μA	Max	V <sub>OUT</sub> = V <sub>CC</sub>
I <sub>ZZ</sub>	Bus Drainage Test			100	μA	0.0	V <sub>OUT</sub> = 5.25V
I <sub>CCH</sub>	Power Supply Current		26	32	mA	Max	All Outputs HIGH
I <sub>CCL</sub>	Power Supply Current		55	65	mA	Max	All Outputs LOW
I <sub>CCZ</sub>	Power Supply Current		32	40	mA	Max	Outputs 3-STATED
C <sub>IN</sub>	Input Capacitance		8.0		pF	5.0	

AC Electrical Characteristics							
Symbol	Parameter	T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF			T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF		Units
		Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay	1.7	2.9	4.5	1.7	4.5	ns
t <sub>PHL</sub>	D <sub>n</sub> to O <sub>n</sub>	1.7	2.6	4.5	1.7	4.5	
t <sub>PLH</sub>	Propagation Delay	2.6	6.0	8.5	2.6	8.5	ns
t <sub>PHL</sub>	LE to O <sub>n</sub>	2.6	4.3	8.5	2.6	8.5	
t <sub>PZH</sub>	Output Enable Time	2.8	4.0	7.4	2.8	7.4	ns
t <sub>PZL</sub>		2.8	5.0	7.4	2.8	7.4	
t <sub>PHZ</sub>	Output Disable Time	2.2	4.0	6.3	2.2	6.3	ns
t <sub>PLZ</sub>		2.2	3.5	6.3	2.2	6.3	

AC Operating Requirements							
Symbol	Parameter	T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF			T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF		Units
		Min	Typ	Max	Min	Max	
t <sub>S</sub> (H)	Setup Time, HIGH or LOW	1.0	-0.4		1.0		ns
t <sub>S</sub> (L)	D <sub>n</sub> to LE	1.0	-0.7		1.0		
t <sub>H</sub> (H)	Hold Time, HIGH or LOW	2.5	0.9		2.5		ns
t <sub>H</sub> (L)	D <sub>n</sub> to LE	2.5	0.6		2.5		
t <sub>W</sub> (H)	LE Pulse Width HIGH	5.0	2.7		5.0		ns

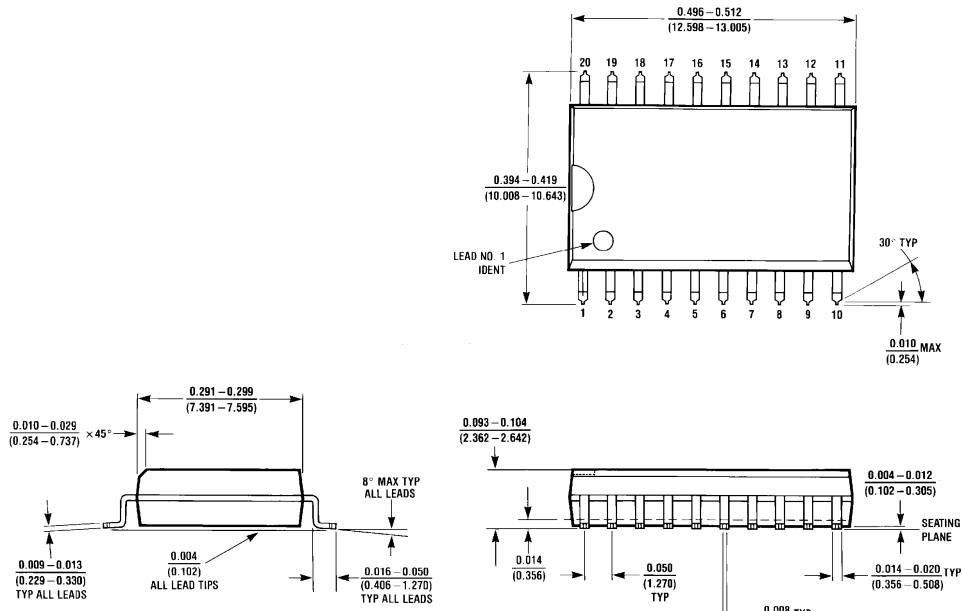
Extended AC Electrical Characteristics							
Symbol	Parameter	T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF Eight Outputs Switching (Note 3)		T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 250 pF (Note 4)		Units	
		Min	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay	1.7	5.7	3.4	8.1	ns	
t <sub>PHL</sub>	D <sub>n</sub> to O <sub>n</sub>	1.7	5.7	3.4	8.1		
t <sub>PLH</sub>	Propagation Delay	2.6	9.8	4.5	12.3	ns	
t <sub>PHL</sub>	LE to O <sub>n</sub>	2.6	9.8	4.5	12.3		
t <sub>PZH</sub>	Output Enable Time	2.8	9.6			ns	
t <sub>PZL</sub>		2.8	9.6				
t <sub>PHZ</sub>	Output Disable Time	2.2	7.3			ns	
t <sub>PLZ</sub>		2.2	7.3				
t <sub>OSSL</sub> (Note 5)	Pin-to-Pin Skew for HL Transitions		1.3			ns	
t <sub>OSLH</sub> (Note 5)	Pin-to-Pin Skew for LH Transitions		1.3			ns	
t <sub>OST</sub> (Note 5)	Pin-to-Pin Skew for HL/LH Transitions		3.0			ns	

**Note 3:** This specification is guaranteed but not tested. The limits apply to propagation delays for all paths described switching in phase, i.e. all LOW-to-HIGH, HIGH-to-LOW, 3-STATE-to-HIGH, etc.

**Note 4:** These specifications guaranteed but not tested. The limits represent propagation delays with 250 pF load capacitors in place of the 50 pF load capacitors in the standard AC load. This specification pertains to single output switching only.

**Note 5:** Skew is defined as the absolute value of the difference between the actual propagation delays for any two outputs of the same device. The specification applies to any outputs switching HIGH-to-LOW, (t<sub>OSSL</sub>), LOW-to-HIGH, (t<sub>OSLH</sub>) or any combination of HIGH-to-LOW and/or LOW-to-HIGH, (t<sub>OST</sub>). Specifications guaranteed with all outputs switching in phase.

**Physical Dimensions** inches (millimeters) unless otherwise noted



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

