

IN74HC373A

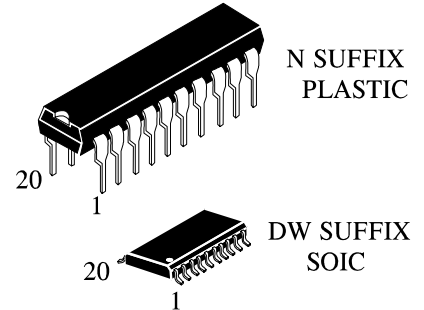
OCTAL 3-STATE NONINVERTING TRANSPARENT LATCH High-Performance Silicon-Gate CMOS

The IN74HC373A is identical in pinout to the LS/ALS373. The device inputs are compatible with standard CMOS outputs; with pullup resistors, they are compatible with LS/ALSTTL outputs.

These latches appear transparent to data (i.e., the outputs change asynchronously) when Latch Enable is high. When Latch Enable goes low, data meeting the setup and hold time becomes latched.

The Output Enable input does not affect the state of the latches, but when Output Enable is high, all device outputs are forced to the high-impedance state. Thus, data may be latched even when the outputs are not enabled.

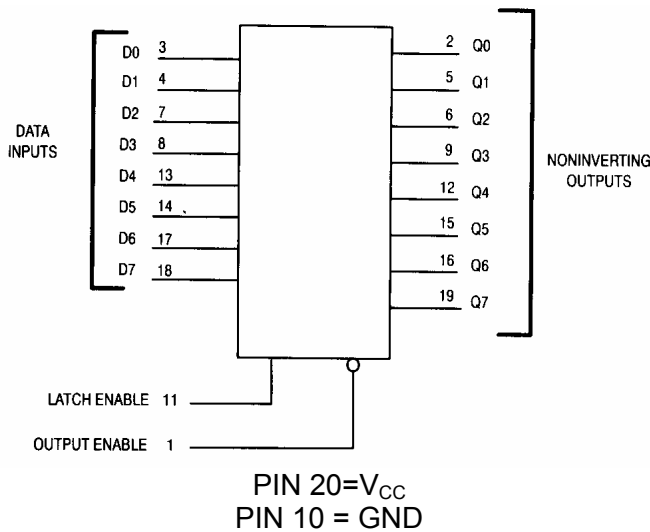
- Outputs Directly Interface to CMOS, NMOS, and TTL
- Operating Voltage Range: 2.0 to 6.0 V
- Low Input Current: 1.0 μ A
- High Noise Immunity Characteristic of CMOS Devices



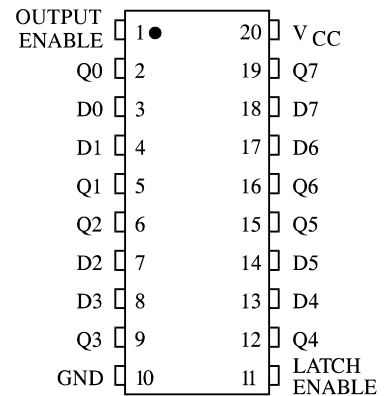
ORDERING INFORMATION

IN74HC373AN Plastic
IN74HC373ADW SOIC
 $T_A = -55^\circ$ to 125° C for all packages

LOGIC DIAGRAM



PIN ASSIGNMENT



FUNCTION TABLE

Inputs		Output	
Output Enable	Latch Enable	D	Q
L	H	H	H
L	H	L	L
L	L	X	No Change
H	X	X	Z

X = Don't Care

Z = High Impedance

IN74HC373A

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V_{IN}	DC Input Voltage (Referenced to GND)	-1.5 to $V_{CC} + 1.5$	V
V_{OUT}	DC Output Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
I_{IN}	DC Input Current, per Pin	± 20	mA
I_{OUT}	DC Output Current, per Pin	± 35	mA
I_{CC}	DC Supply Current, V_{CC} and GND Pins	± 75	mA
P_D	Power Dissipation in Still Air, Plastic DIP+ SOIC Package+	750 500	mW
Tstg	Storage Temperature	-65 to +150	$^{\circ}\text{C}$
T_L	Lead Temperature, 1 mm from Case for 10 Seconds (Plastic DIP or SOIC Package)	260	$^{\circ}\text{C}$

*Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

+Derating - Plastic DIP: - 10 mW/ $^{\circ}\text{C}$ from 65 $^{\circ}$ to 125 $^{\circ}\text{C}$

SOIC Package: : - 7 mW/ $^{\circ}\text{C}$ from 65 $^{\circ}$ to 125 $^{\circ}\text{C}$

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	2.0	6.0	V
V_{IN}, V_{OUT}	DC Input Voltage, Output Voltage (Referenced to GND)	0	V_{CC}	V
T_A	Operating Temperature, All Package Types	-55	+125	$^{\circ}\text{C}$
t_r, t_f	Input Rise and Fall Time (Figure 1)			ns
	$V_{CC} = 2.0 \text{ V}$	0	1000	
	$V_{CC} = 4.5 \text{ V}$	0	500	
	$V_{CC} = 6.0 \text{ V}$	0	400	

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{IN} and V_{OUT} should be constrained to the range $\text{GND} \leq (V_{IN} \text{ or } V_{OUT}) \leq V_{CC}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}). Unused outputs must be left open.

IN74HC373A

DC ELECTRICAL CHARACTERISTICS (Voltages Referenced to GND)

Symbol	Parameter	Test Conditions	V _{CC} V	Guaranteed Limit			Unit
				25 °C to -55°C	≤85 °C	≤125 °C	
V _{IH}	Minimum High-Level Input Voltage	V _{OUT} =0.1 V or V _{CC} -0.1 V I _{OUT} ≤ 20 μA	2.0	1.5	1.5	1.5	V
			4.5	3.15	3.15	3.15	
			6.0	4.2	4.2	4.2	
V _{IL}	Maximum Low-Level Input Voltage	V _{OUT} =0.1 V or V _{CC} -0.1 V I _{OUT} ≤ 20 μA	2.0	0.5	0.5	0.5	V
			4.5	1.35	1.35	1.35	
			6.0	1.8	1.8	1.8	
V _{OH}	Minimum High-Level Output Voltage	V _{IN} =V _{IH} or V _{IL} I _{OUT} ≤ 20 μA	2.0	1.9	1.9	1.9	V
			4.5	4.4	4.4	4.4	
		6.0	5.9	5.9	5.9		
		V _{IN} =V _{IH} or V _{IL} I _{OUT} ≤ 6.0 mA I _{OUT} ≤ 7.8 mA	4.5	3.98	3.84	3.7	
6.0	5.48	5.34	5.2				
V _{OL}	Maximum Low-Level Output Voltage	V _{IN} = V _{IL} or V _{IH} I _{OUT} ≤ 20 μA	2.0	0.1	0.1	0.1	V
			4.5	0.1	0.1	0.1	
		6.0	0.1	0.1	0.1		
		V _{IN} = V _{IL} or V _{IH} I _{OUT} ≤ 6.0 mA I _{OUT} ≤ 7.8 mA	4.5	0.26	0.33	0.4	
6.0	0.26	0.33	0.4				
I _{IN}	Maximum Input Leakage Current	V _{IN} =V _{CC} or GND	6.0	±0.1	±1.0	±1.0	μA
I _{OZ}	Maximum Three-State Leakage Current	Output in High-State V _{IN} = V _{IL} or V _{IH} V _{OUT} =V _{CC} or GND	6.0	±0.5	±5.0	±10	μA
I _{CC}	Maximum Quiescent Supply Current (per Package)	V _{IN} =V _{CC} or GND I _{OUT} =0μA	6.0	4.0	40	160	μA

IN74HC373A

AC ELECTRICAL CHARACTERISTICS ($C_L=50\text{pF}$, Input $t_r=t_f=6.0\text{ ns}$)

Symbol	Parameter	V_{CC} V	Guaranteed Limit			Unit
			25 °C to -55°C	≤85°C	≤125 °C	
t_{PLH} , t_{PHL}	Maximum Propagation Delay, Input D to Q (Figures 1 and 5)	2.0	125	155	190	ns
		4.5	25	31	38	
		6.0	21	26	32	
t_{PLH} , t_{PHL}	Maximum Propagation Delay , Latch Enable to Q (Figures 2 and 5)	2.0	140	175	210	ns
		4.5	28	35	42	
		6.0	24	30	36	
t_{PLZ} , t_{PHZ}	Maximum Propagation Delay ,Output Enable to Q (Figures 3 and 6)	2.0	150	190	225	ns
		4.5	30	38	45	
		6.0	26	33	38	
t_{PZL} , t_{PZH}	Maximum Propagation Delay , Output Enable to Q (Figures 3 and 6)	2.0	150	190	225	ns
		4.5	30	38	45	
		6.0	26	33	38	
t_{TLH} , t_{THL}	Maximum Output Transition Time, Any Output (Figures 1 and 5)	2.0	60	75	90	ns
		4.5	12	15	18	
		6.0	10	13	15	
C_{IN}	Maximum Input Capacitance	-	10	10	10	pF
C_{OUT}	Maximum Three-State Output Capacitance (Output in High-Impedance State)	-	15	15	15	pF

C_{PD}	Power Dissipation Capacitance (Per Enabled Output)	Typical @25°C, $V_{CC}=5.0\text{ V}$			pF
	Used to determine the no-load dynamic power consumption: $P_D=C_{PD}V_{CC}^2f+I_{CC}V_{CC}$	36			

TIMING REQUIREMENTS ($C_L=50\text{pF}$, Input $t_r=t_f=6.0\text{ ns}$)

Symbol	Parameter	V_{CC} V	Guaranteed Limit			Unit
			25 °C to -55°C	≤85°C	≤125°C	
t_{SU}	Minimum Setup Time, Input D to Latch Enable (Figure 4)	2.0	25	30	40	ns
		4.5	5.0	6.0	8.0	
		6.0	5.0	6.0	7.0	
t_H	Minimum Hold Time, Latch Enable to Input D (Figure 4)	2.0	5.0	5.0	5.0	ns
		4.5	5.0	5.0	5.0	
		6.0	5.0	5.0	5.0	
t_W	Minimum Pulse Width, Latch Enable (Figure 2)	2.0	60	75	90	ns
		4.5	12	15	18	
		6.0	10	13	15	
t_r , t_f	Maximum Input Rise and Fall Times (Figure 1)	2.0	1000	1000	1000	ns
		4.5	500	500	500	
		6.0	400	400	400	

IN74HC373A

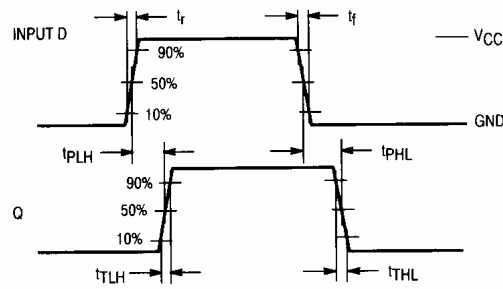


Figure 1. Switching Waveforms

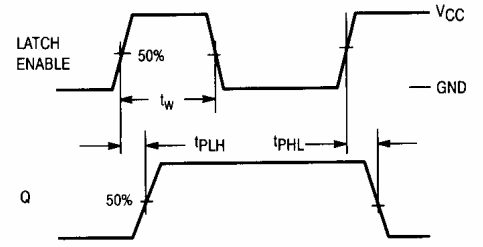


Figure 2. Switching Waveforms

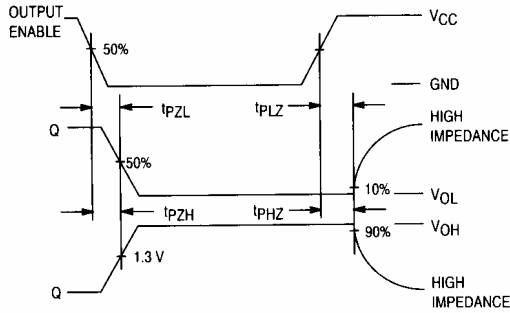


Figure 3. Switching Waveforms

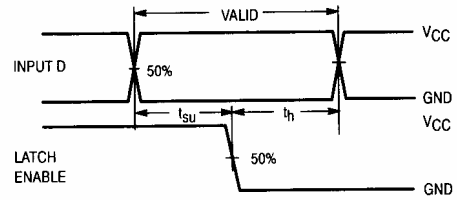


Figure 4. Switching Waveforms

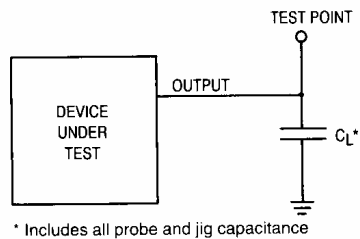


Figure 5. Test Circuit

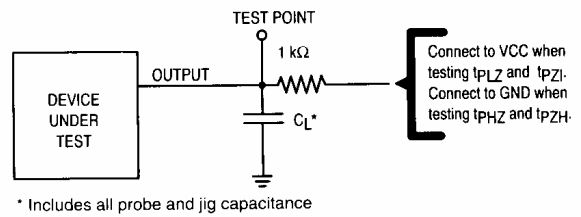


Figure 6. Test Circuit

EXPANDED LOGIC DIAGRAM

