



## U74HC373

CMOS IC

### OCTAL D-TYPE TRANSPARENT LATCH

#### DESCRIPTION

The **U74HC373** consists of eight D-type transparent latches with 3-state outputs. When latched enable (LE) is high, the latches operate at the transparent mode, and the latches' output will change

corresponding with the data present at D0 to D7. When output enable ( $\overline{OE}$ ) is low, the contents of the latches will be present at the outputs. The outputs will be in the high impedance when  $\overline{OE}$  goes high.

#### FEATURES

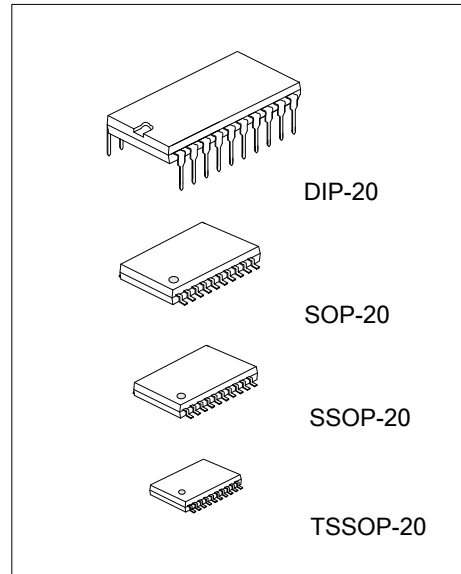
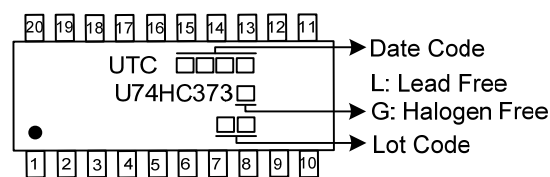
- \* Operation Voltage Range: 2~6V
- \* Drive Up to 15 LSTTL Loads
- \* 3-State Outputs
- \* Output Capability Suitable for Bus Driving

#### ORDERING INFORMATION

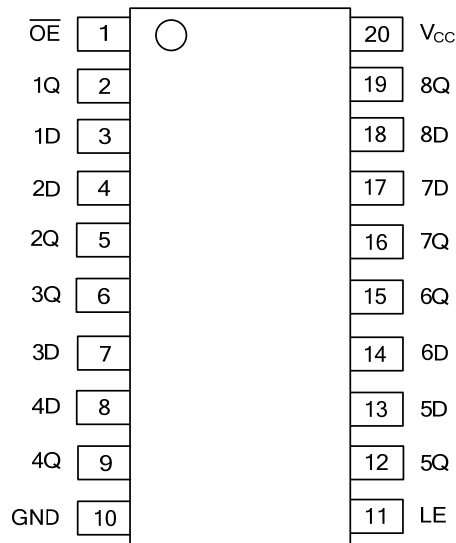
| Ordering Number |                 | Package  | Packing   |
|-----------------|-----------------|----------|-----------|
| Lead Free       | Halogen Free    |          |           |
| U74HC373L-D20-T | U74HC373G-D20-T | DIP-20   | Tube      |
| U74HC373L-S20-R | U74HC373G-S20-R | SOP-20   | Tape Reel |
| U74HC373L-R20-R | U74HC373G-R20-R | SSOP-20  | Tape Reel |
| U74HC373L-P20-R | U74HC373G-P20-R | TSSOP-20 | Tape Reel |

|   |  |
|---|--|
| <p>U74HC373G-D20-T</p> <p>(1) Packing Type<br/>(2) Package Type<br/>(3) Green Package</p> | <p>(1) T: Tube, R: Tape Reel<br/>(2) D20: DIP-20, P20: TSSOP-20, R20: SSOP-20, S20: SOP-20<br/>(3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|---|--|

#### MARKING



■ PIN CONFIGURATION

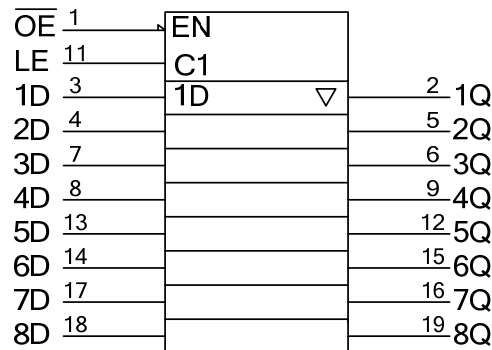


■ FUNCTION TABLE

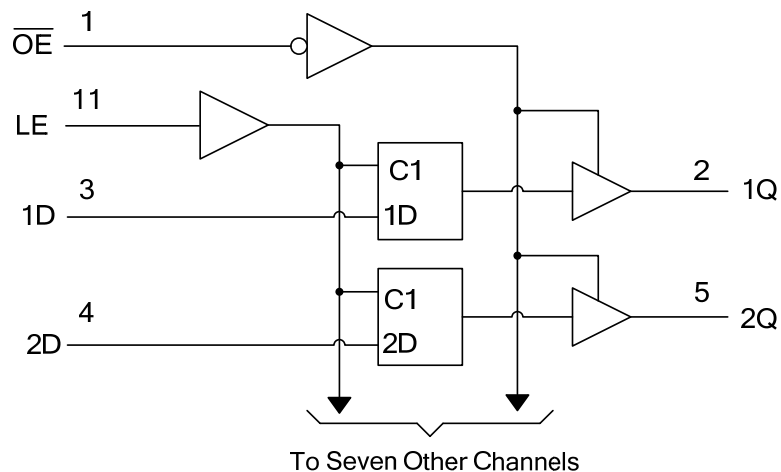
| INPUTS(OE) | INPUTS(LE) | INPUTS(D) | OUTPUT(Q)      |
|------------|------------|-----------|----------------|
| L          | H          | H         | H              |
| L          | H          | L         | L              |
| L          | L          | X         | Q <sub>0</sub> |
| H          | X          | X         | Z              |

Note: H: HIGH voltage level; L: LOW voltage level.

■ LOGIC SYMBOL



■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

| PARAMETER               | SYMBOL    | RATINGS     | UNIT        |
|-------------------------|-----------|-------------|-------------|
| Supply Voltage          | $V_{CC}$  | -0.5 ~ 7    | V           |
| $V_{CC}$ or GND Current | $I_{CC}$  | $\pm 70$    | mA          |
| Output Current          | $I_{OUT}$ | $\pm 35$    | mA          |
| Input Clamp Current     | $I_{IK}$  | $\pm 20$    | mA          |
| Output Clamp Current    | $I_{OK}$  | $\pm 20$    | mA          |
| Storage Temperature     | $T_{STG}$ | -65 ~ + 150 | $^{\circ}C$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS (Unless otherwise specified)

| PARAMETER                | SYMBOL     | TEST CONDITIONS   | MIN  | TYP | MAX      | UNIT        |
|--------------------------|------------|-------------------|------|-----|----------|-------------|
| Supply Voltage           | $V_{CC}$   |                   | 2    | 5   | 6        | V           |
| High-level Input Voltage | $V_{IH}$   | $V_{CC}=2.0V$     | 1.5  |     |          | V           |
|                          |            | $V_{CC}=4.5V$     | 3.15 |     |          |             |
|                          |            | $V_{CC}=6.0V$     | 4.2  |     |          |             |
| Low-level Input Voltage  | $V_{IL}$   | $V_{CC}=2.0V$     | 0    |     | 0.5      | V           |
|                          |            | $V_{CC}=4.5V$     | 0    |     | 1.35     |             |
|                          |            | $V_{CC}=6.0V$     | 0    |     | 1.8      |             |
| Input Voltage            | $V_{IN}$   |                   | 0    |     | $V_{CC}$ | V           |
| Output Voltage           | $V_{OUT}$  | High or low state | 0    |     | $V_{CC}$ | V           |
| Input Rise or Fall Times | $t_R, t_F$ | $V_{CC}=2.0V$     |      |     | 1        | $\mu s$     |
|                          |            | $V_{CC}=4.5V$     |      |     | 0.5      |             |
|                          |            | $V_{CC}=6.0V$     |      |     | 0.4      |             |
| Operating Temperature    | $T_A$      |                   | -40  |     | +125     | $^{\circ}C$ |

■ THERMAL DATA

| PARAMETER           | SYMBOL   | RATINGS | UNIT          |
|---------------------|----------|---------|---------------|
| Junction to Ambient | DIP-20   | 52      | $^{\circ}C/W$ |
|                     | SOP-20   | 80      |               |
|                     | SSOP-20  | 96      |               |
|                     | TSSOP-20 | 103     |               |

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

| PARAMETER                      | SYMBOL        | TEST CONDITIONS   | MIN  | TYP        | MAX       | UNIT    |
|--------------------------------|---------------|---|------|------------|-----------|---------|
| Output Voltage High-Level      | $V_{OH}$      | $V_{CC}=2.0V$   | 1.9  | 1.998      |           | V       |
|                                |               | $V_{CC}=4.5V$   | 4.4  | 4.499      |           |         |
|                                |               | $V_{CC}=6.0V$   | 5.9  | 5.999      |           |         |
|                                |               | $V_{CC}=4.5V, I_{OH}=-6mA, V_{IN}=V_{IH}$ or $V_{IL}$   | 3.98 | 4.3        |           |         |
|                                |               | $V_{CC}=6.0V, I_{OH}=-7.8mA, V_{IN}=V_{IH}$ or $V_{IL}$ | 5.48 | 5.8        |           |         |
| Output Voltage Low-Level       | $V_{OL}$      | $V_{CC}=2.0V$   |      | 2          | 100       | mV      |
|                                |               | $V_{CC}=4.5V$   |      | 1          | 100       |         |
|                                |               | $V_{CC}=6.0V$   |      | 1          | 100       |         |
|                                |               | $V_{CC}=4.5V, I_{OL}=6mA, V_{IN}=V_{IH}$ or $V_{IL}$    |      | 170        | 260       |         |
|                                |               | $V_{CC}=6.0V, I_{OL}=7.8mA, V_{IN}=V_{IH}$ or $V_{IL}$  |      | 150        | 260       |         |
| Input Leakage Current          | $I_{I(LEAK)}$ | $V_{CC}=6.0V, V_{IN}=V_{CC}$ or 0                       |      | $\pm 0.1$  | $\pm 100$ | nA      |
| Disable Output Leakage Current | $I_{OZ}$      | $V_{CC}=6.0V, V_{OUT}=V_{CC}$ or 0                      |      | $\pm 0.01$ | $\pm 0.5$ | $\mu A$ |
| Quiescent Supply Current       | $I_Q$         | $V_{CC}=6.0V, V_{IN}=V_{CC}$ or 0, $I_{OUT}=0$          |      |            | 8         | $\mu A$ |
| Input Capacitance              | $C_{IN}$      | $V_{CC}=2.0V \sim 6.0V$                                 |      | 3          | 10        | pF      |

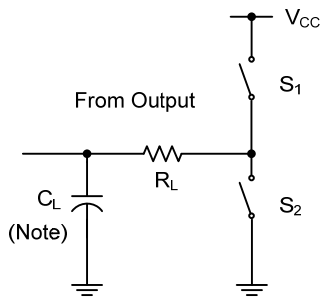
■ SWITCHING CHARACTERISTICS (see test circuit and waveforms)

| PARAMETER  | SYMBOL            | TEST CONDITIONS | MIN         | TYP         | MAX | UNIT |    |
|--|-------------------|-----------------|-------------|-------------|-----|------|----|
| Propagation delay from input (D) to output (Q)                   | $t_{PLH}/t_{PHL}$ | $V_{CC}=2.0V$   | $C_L=50pF$  |             | 58  | 150  | ns |
|  |                   | $V_{CC}=4.5V$   |             | 15          | 30  |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 13          | 26  |      |    |
|  |                   | $V_{CC}=2.0V$   |             | $C_L=150pF$ | 82  | 200  |    |
|  |                   | $V_{CC}=4.5V$   |             |             | 22  | 40   |    |
|  |                   | $V_{CC}=6.0V$   |             |             | 19  | 34   |    |
| Propagation delay from input (LE) to output (Q)                  | $t_{PLH}/t_{PHL}$ | $V_{CC}=2.0V$   | $C_L=50pF$  |             | 73  | 175  | ns |
|  |                   | $V_{CC}=4.5V$   |             | 18          | 35  |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 15          | 30  |      |    |
|  |                   | $V_{CC}=2.0V$   | $C_L=150pF$ | 100         | 225 |      |    |
|  |                   | $V_{CC}=4.5V$   |             | 24          | 45  |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 20          | 38  |      |    |
| Output enable time from input ( $\overline{OE}$ ) to output (Q)  | $t_{PZL}/t_{PZH}$ | $V_{CC}=2.0V$   | $C_L=50pF$  |             | 65  | 150  | ns |
|  |                   | $V_{CC}=4.5V$   |             | 17          | 30  |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 14          | 26  |      |    |
|  |                   | $V_{CC}=2.0V$   | $C_L=150pF$ | 90          | 200 |      |    |
|  |                   | $V_{CC}=4.5V$   |             | 23          | 40  |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 19          | 34  |      |    |
| Output disable time from input ( $\overline{OE}$ ) to output (Q) | $t_{PLZ}/t_{PHZ}$ | $V_{CC}=2.0V$   | $C_L=50pF$  |             | 50  | 150  | ns |
|  |                   | $V_{CC}=4.5V$   |             | 15          | 30  |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 13          | 26  |      |    |
| to Q   | $t_T$             | $V_{CC}=2.0V$   | $C_L=150pF$ |             | 28  | 60   | ns |
|  |                   | $V_{CC}=4.5V$   |             | 8           | 12  |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 6           | 10  |      |    |
| Pulse Width  | $t_W$             | $V_{CC}=2.0V$   |             | 80          |     | ns   |    |
|  |                   | $V_{CC}=4.5V$   |             | 16          |     |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 14          |     |      |    |
| Setup Time   | $t_{SU}$          | $V_{CC}=2.0V$   |             | 50          |     | ns   |    |
|  |                   | $V_{CC}=4.5V$   |             | 10          |     |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 9           |     |      |    |
| Hold Time  | $t_H$             | $V_{CC}=2.0V$   |             | 20          |     | ns   |    |
|  |                   | $V_{CC}=4.5V$   |             | 10          |     |      |    |
|  |                   | $V_{CC}=6.0V$   |             | 10          |     |      |    |

■ OPERATING CHARACTERISTICS (Unless otherwise specified)

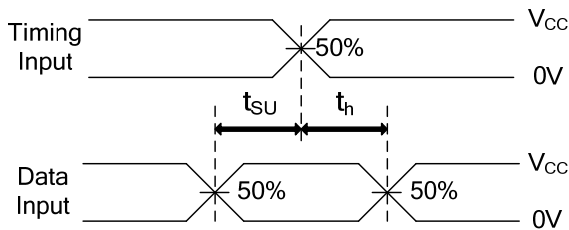
| PARAMETER                     | SYMBOL   | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|----------|-----------------|-----|-----|-----|------|
| Power Dissipation Capacitance | $C_{PD}$ | No Load         |     | 100 |     | pF   |

## TEST CIRCUIT AND WAVEFORMS

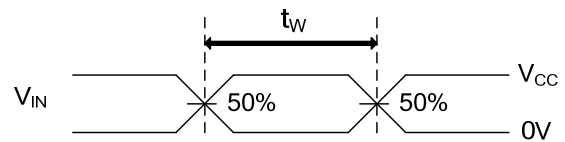


TEST CIRCUIT

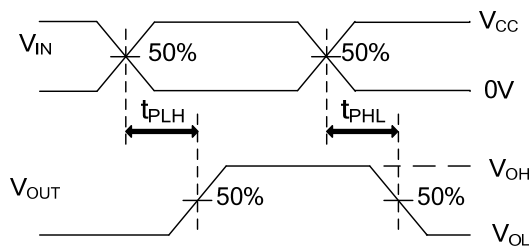
|           | $R_L$       | $C_L$ | $S_1$  | $S_2$  |
|-----------|-------------|-------|--------|--------|
| $t_{PZH}$ | 1k $\Omega$ | 50pF, | Open   | Closed |
| $t_{PZL}$ |             | 150pF | Closed | Open   |
| $t_{PHZ}$ | 1k $\Omega$ | 50pF  | Open   | Closed |
| $t_{PLZ}$ |             | 150pF | Closed | Open   |
| $t_{PHL}$ | -           | 50pF, | Open   | Open   |
| $t_{PLH}$ |             | 150pF |        |        |



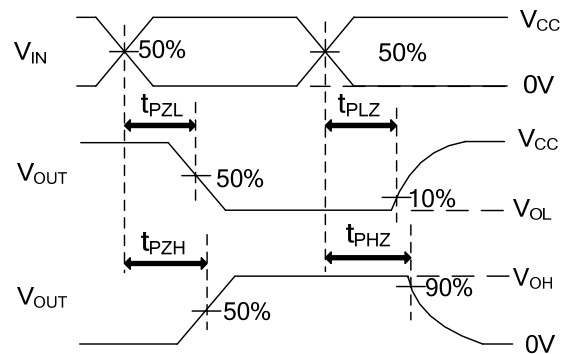
SETUP TIME AND HOLD TIME



PULSE WIDTH



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Note:  $C_L$  includes probe and jig capacitance.  
 $PRR \leq 1\text{MHz}$ ,  $Z_o = 50\Omega$ ,  $t_R = 6\text{ns}$ ,  $t_F = 6\text{ns}$

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