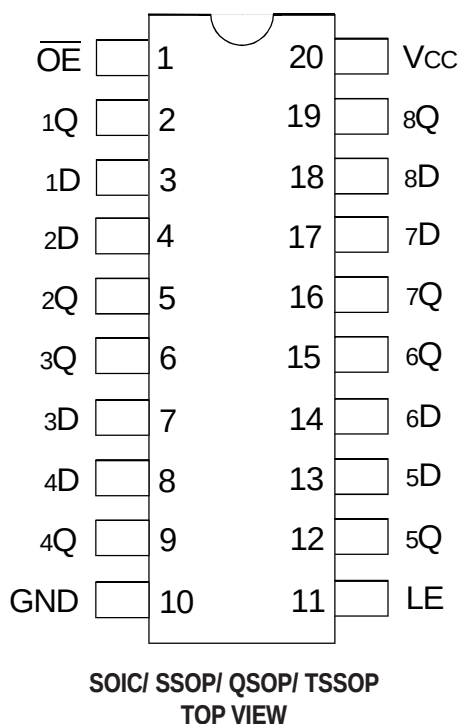




## PIN CONFIGURATION



## ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>

| Symbol                             | Description                                                           | Max          | Unit |
|------------------------------------|-----------------------------------------------------------------------|--------------|------|
| V <sub>TERM</sub>                  | Terminal Voltage with Respect to GND                                  | −0.5 to +6.5 | V    |
| T <sub>STG</sub>                   | Storage Temperature                                                   | −65 to +150  | °C   |
| I <sub>OUT</sub>                   | DC Output Current                                                     | −50 to +50   | mA   |
| I <sub>IK</sub><br>I <sub>OK</sub> | Continuous Clamp Current,<br>V <sub>I</sub> < 0 or V <sub>O</sub> < 0 | −50          | mA   |
| I <sub>CC</sub><br>I <sub>SS</sub> | Continuous Current through each<br>V <sub>CC</sub> or GND             | ±100         | mA   |

### NOTE:

- Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

## CAPACITANCE (T<sub>A</sub> = +25°C, F = 1.0MHz)

| Symbol           | Parameter <sup>(1)</sup> | Conditions            | Typ. | Max. | Unit |
|------------------|--------------------------|-----------------------|------|------|------|
| C <sub>IN</sub>  | Input Capacitance        | V <sub>IN</sub> = 0V  | 4.5  | 6    | pF   |
| C <sub>OUT</sub> | Output Capacitance       | V <sub>OUT</sub> = 0V | 5.5  | 8    | pF   |
| C <sub>I/O</sub> | I/O Port Capacitance     | V <sub>IN</sub> = 0V  | 6.5  | 8    | pF   |

### NOTE:

- As applicable to the device type.

## PIN DESCRIPTION

| Pin Names       | Description                       |
|-----------------|-----------------------------------|
| $\overline{OE}$ | Output Enable Inputs (Active LOW) |
| LE              | Latch Enable Input                |
| x <sub>D</sub>  | Data Inputs                       |
| x <sub>Q</sub>  | 3-State Data Outputs              |

## FUNCTION TABLE (EACH LATCH)<sup>(1)</sup>

| Inputs         |    |                 | Outputs          |
|----------------|----|-----------------|------------------|
| x <sub>D</sub> | LE | $\overline{OE}$ | x <sub>Q</sub>   |
| H              | H  | L               | H                |
| L              | H  | L               | L                |
| X              | L  | L               | Q <sup>(2)</sup> |
| X              | X  | H               | Z                |

### NOTES:

- H = HIGH Voltage Level  
X = Don't Care  
L = LOW Voltage Level  
Z = High-Impedance
- Output level before the indicated steady-state input conditions were established.

## DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

Operating Condition:  $T_A = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

| Symbol                              | Parameter                                              | Test Conditions                                                       |                                          | Min. | Typ. <sup>(1)</sup> | Max.     | Unit          |
|-------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------|------|---------------------|----------|---------------|
| $V_{IH}$                            | Input HIGH Voltage Level                               | $V_{CC} = 2.3\text{V}$ to $2.7\text{V}$                               |                                          | 1.7  | —                   | —        | V             |
|                                     |                                                        | $V_{CC} = 2.7\text{V}$ to $3.6\text{V}$                               |                                          | 2    | —                   | —        |               |
| $V_{IL}$                            | Input LOW Voltage Level                                | $V_{CC} = 2.3\text{V}$ to $2.7\text{V}$                               |                                          | —    | —                   | 0.7      | V             |
|                                     |                                                        | $V_{CC} = 2.7\text{V}$ to $3.6\text{V}$                               |                                          | —    | —                   | 0.8      |               |
| $I_{IH}$<br>$I_{IL}$                | Input Leakage Current                                  | $V_{CC} = 3.6\text{V}$                                                | $V_I = 0$ to $5.5\text{V}$               | —    | —                   | $\pm 5$  | $\mu\text{A}$ |
| $I_{OZH}$<br>$I_{OZL}$              | High Impedance Output Current<br>(3-State Output pins) | $V_{CC} = 3.6\text{V}$                                                | $V_O = 0$ to $5.5\text{V}$               | —    | —                   | $\pm 10$ | $\mu\text{A}$ |
| $I_{OFF}$                           | Input/Output Power Off Leakage                         | $V_{CC} = 0\text{V}$ , $V_{IN}$ or $V_O \leq 5.5\text{V}$             |                                          | —    | —                   | $\pm 50$ | $\mu\text{A}$ |
| $V_{IK}$                            | Clamp Diode Voltage                                    | $V_{CC} = 2.3\text{V}$ , $I_{IN} = -18\text{mA}$                      |                                          | —    | -0.7                | -1.2     | V             |
| $V_H$                               | Input Hysteresis                                       | $V_{CC} = 3.3\text{V}$                                                |                                          | —    | 100                 | —        | mV            |
| $I_{CCL}$<br>$I_{CCH}$<br>$I_{CCZ}$ | Quiescent Power Supply Current                         | $V_{CC} = 3.6\text{V}$                                                | $V_{IN} = \text{GND}$ or $V_{CC}$        | —    | —                   | 10       | $\mu\text{A}$ |
|                                     |                                                        |                                                                       | $3.6 \leq V_{IN} \leq 5.5\text{V}^{(2)}$ | —    | —                   | 10       |               |
| $\Delta I_{CC}$                     | Quiescent Power Supply Current Variation               | One input at $V_{CC} - 0.6\text{V}$ , other inputs at $V_{CC}$ or GND |                                          | —    | —                   | 500      | $\mu\text{A}$ |

### NOTES:

1. Typical values are at  $V_{CC} = 3.3\text{V}$ ,  $+25^{\circ}\text{C}$  ambient.
2. This applies in the disabled state only.

## OUTPUT DRIVE CHARACTERISTICS

| Symbol   | Parameter           | Test Conditions <sup>(1)</sup>          |                          | Min.           | Max. | Unit |
|----------|---------------------|-----------------------------------------|--------------------------|----------------|------|------|
| $V_{OH}$ | Output HIGH Voltage | $V_{CC} = 2.3\text{V}$ to $3.6\text{V}$ | $I_{OH} = -0.1\text{mA}$ | $V_{CC} - 0.2$ | —    | V    |
|          |                     | $V_{CC} = 2.3\text{V}$                  | $I_{OH} = -6\text{mA}$   | 2              | —    |      |
|          |                     | $V_{CC} = 2.3\text{V}$                  | $I_{OH} = -12\text{mA}$  | 1.7            | —    |      |
|          |                     | $V_{CC} = 2.7\text{V}$                  |                          | 2.2            | —    |      |
|          |                     | $V_{CC} = 3\text{V}$                    |                          | 2.4            | —    |      |
|          |                     | $V_{CC} = 3\text{V}$                    | $I_{OH} = -24\text{mA}$  | 2.2            | —    |      |
| $V_{OL}$ | Output LOW Voltage  | $V_{CC} = 2.3\text{V}$ to $3.6\text{V}$ | $I_{OL} = 0.1\text{mA}$  | —              | 0.2  | V    |
|          |                     | $V_{CC} = 2.3\text{V}$                  | $I_{OL} = 6\text{mA}$    | —              | 0.4  |      |
|          |                     |                                         | $I_{OL} = 12\text{mA}$   | —              | 0.7  |      |
|          |                     | $V_{CC} = 2.7\text{V}$                  | $I_{OL} = 12\text{mA}$   | —              | 0.4  |      |
|          |                     | $V_{CC} = 3\text{V}$                    | $I_{OL} = 24\text{mA}$   | —              | 0.55 |      |

### NOTE:

1.  $V_{IH}$  and  $V_{IL}$  must be within the min. or max. range shown in the DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE table for the appropriate  $V_{CC}$  range.  
 $T_A = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

OPERATING CHARACTERISTICS,  $V_{CC} = 3.3V \pm 0.3V$ ,  $T_A = 25^\circ C$

| Symbol | Parameter                                                | Test Conditions           | Typical | Unit |
|--------|----------------------------------------------------------|---------------------------|---------|------|
| CPD    | Power Dissipation Capacitance per Latch Outputs enabled  | $C_L = 0pF$ , $f = 10MHz$ | 46      | pF   |
| CPD    | Power Dissipation Capacitance per Latch Outputs disabled |                           | 3       |      |

SWITCHING CHARACTERISTICS<sup>(1)</sup>

| Symbol                 | Parameter                                    | $V_{CC} = 2.7V$ |      | $V_{CC} = 3.3V \pm 0.3V$ |      | Unit |
|------------------------|----------------------------------------------|-----------------|------|--------------------------|------|------|
|                        |                                              | Min.            | Max. | Min.                     | Max. |      |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>xD to xQ                | —               | 7.8  | 1.5                      | 6.8  | ns   |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>LE to xQ                | —               | 8.2  | 2                        | 7.6  | ns   |
| $t_{PZH}$<br>$t_{PZL}$ | Output Enable Time<br>$\overline{OE}$ to xQ  | —               | 8.7  | 1.5                      | 7.7  | ns   |
| $t_{PHZ}$<br>$t_{PLZ}$ | Output Disable Time<br>$\overline{OE}$ to xQ | —               | 7.6  | 1.5                      | 7    | ns   |
| $t_W$                  | Pulse Duration LE HIGH                       | 3.3             | —    | 3.3                      | —    | ns   |
| $t_{SU}$               | Set-up Time, data before LE $\downarrow$     | 2               | —    | 2                        | —    | ns   |
| $t_H$                  | Hold Time, data after LE $\downarrow$        | 1.5             | —    | 1.5                      | —    | ns   |
| $t_{SK(0)}$            | Output Skew <sup>(2)</sup>                   | —               | —    | —                        | 1    | ns   |

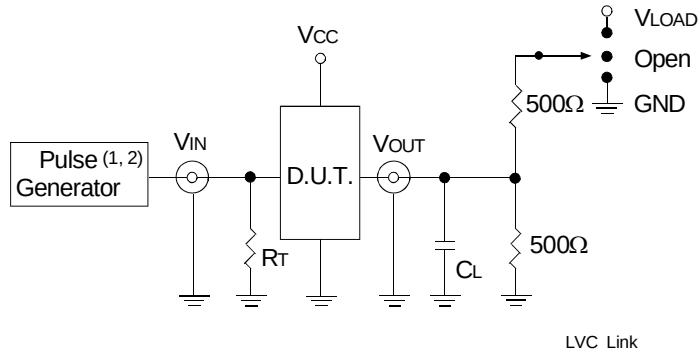
NOTES:

1. See TEST CIRCUITS AND WAVEFORMS.  $T_A = -40^\circ C$  to  $+85^\circ C$ .
2. Skew between any two outputs of the same package and switching in the same direction.

## TEST CIRCUITS AND WAVEFORMS

### TEST CONDITIONS

| Symbol            | V <sub>CC</sub> <sup>(1)</sup> =3.3V±0.3V | V <sub>CC</sub> <sup>(1)</sup> =2.7V | V <sub>CC</sub> <sup>(2)</sup> =2.5V±0.2V | Unit |
|-------------------|-------------------------------------------|--------------------------------------|-------------------------------------------|------|
| V <sub>LOAD</sub> | 6                                         | 6                                    | 2 x V <sub>CC</sub>                       | V    |
| V <sub>IH</sub>   | 2.7                                       | 2.7                                  | V <sub>CC</sub>                           | V    |
| V <sub>T</sub>    | 1.5                                       | 1.5                                  | V <sub>CC</sub> / 2                       | V    |
| V <sub>LZ</sub>   | 300                                       | 300                                  | 150                                       | mV   |
| V <sub>HZ</sub>   | 300                                       | 300                                  | 150                                       | mV   |
| C <sub>L</sub>    | 50                                        | 50                                   | 30                                        | pF   |



Test Circuit for All Outputs

#### DEFINITIONS:

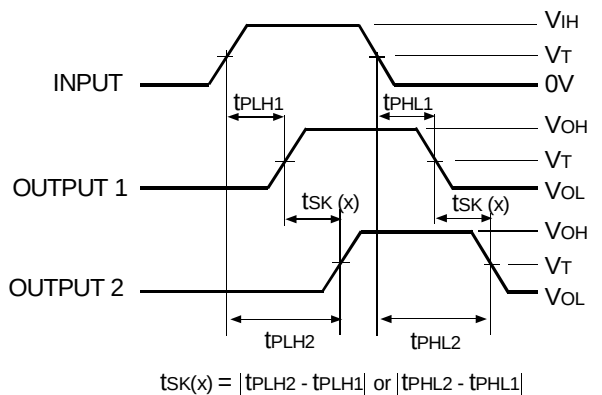
C<sub>L</sub> = Load capacitance: includes jig and probe capacitance.  
R<sub>T</sub> = Termination resistance: should be equal to Z<sub>OUT</sub> of the Pulse Generator.

#### NOTES:

1. Pulse Generator for All Pulses: Rate ≤ 10MHz; t<sub>r</sub> ≤ 2.5ns; t<sub>f</sub> ≤ 2.5ns.
2. Pulse Generator for All Pulses: Rate ≤ 10MHz; t<sub>r</sub> ≤ 2ns; t<sub>f</sub> ≤ 2ns.

### SWITCH POSITION

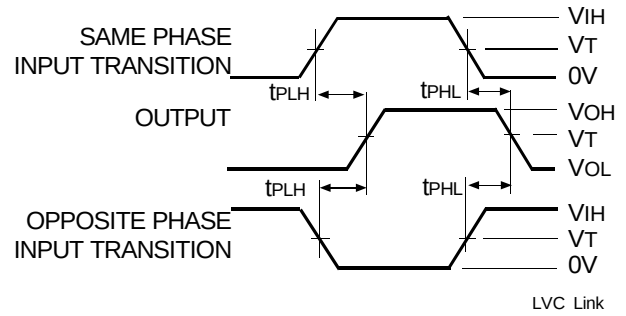
| Test                                    | Switch            |
|-----------------------------------------|-------------------|
| Open Drain<br>Disable Low<br>Enable Low | V <sub>LOAD</sub> |
| Disable High<br>Enable High             | GND               |
| All Other Tests                         | Open              |



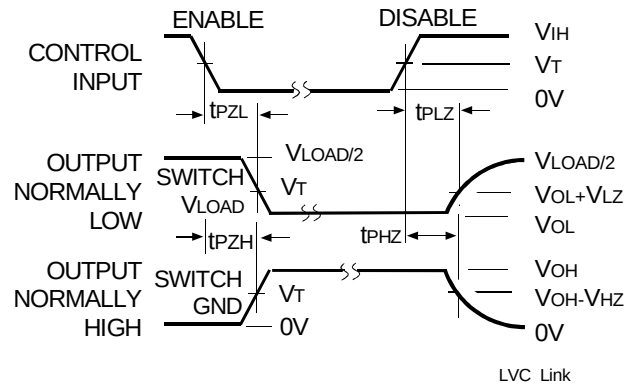
Output Skew - ts(x)

#### NOTES:

1. For ts(x) OUTPUT1 and OUTPUT2 are any two outputs.
2. For ts(b) OUTPUT1 and OUTPUT2 are in the same bank.



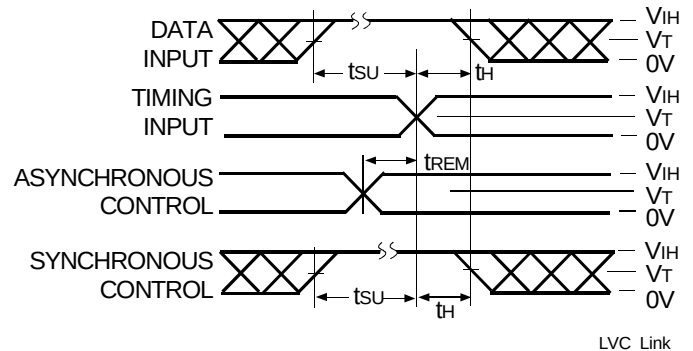
#### Propagation Delay



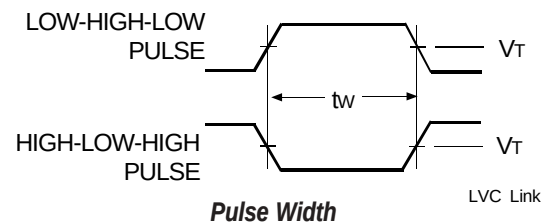
#### Enable and Disable Times

#### NOTE:

1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH.



#### Set-up, Hold, and Release Times



#### Pulse Width

## ORDERING INFORMATION

| IDT         | XX | LVC | X        | XXXX        | XX      |                                                                        |
|-------------|----|-----|----------|-------------|---------|------------------------------------------------------------------------|
| Temp. Range |    |     | Bus-Hold | Device Type | Package |                                                                        |
|             |    |     |          |             | SO      | Small Outline IC (gull wing)                                           |
|             |    |     |          |             | PY      | Shrink Small Outline Package                                           |
|             |    |     |          |             | Q       | Quarter Size Small Outline Package                                     |
|             |    |     |          |             | PG      | Thin Shrink Small Outline Package                                      |
|             |    |     |          | 373A        |         | Octal Transparent D-Type Latch with 3-State Outputs, $\pm 24\text{mA}$ |
|             |    |     | Blank    |             |         | No Bus-hold                                                            |
|             |    |     | 74       |             |         | $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$                         |



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