# 74LVC373A

# Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

Rev. 6 — 28 August 2023

Product data sheet

### 1. General description

The 74LVC373A is an octal D-type transparent latch with 3-state outputs. The device features latch enable (LE) and output enable ( $\overline{OE}$ ) inputs. When LE is HIGH, data at the inputs enter the latches. In this condition the latches are transparent, a latch output will change each time its corresponding D-input changes. When LE is LOW the latches store the information that was present at the inputs a set-up time preceding the HIGH-to-LOW transition of LE. A HIGH on  $\overline{OE}$  causes the outputs to assume a high-impedance OFF-state. Operation of the  $\overline{OE}$  input does not affect the state of the latches. Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V environments.

Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times.

This device is fully specified for partial power down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

#### 2. Features and benefits

- Overvoltage tolerant inputs to 5.5 V
- Wide supply voltage range from 1.2 V to 3.6 V
- CMOS low power consumption
- Direct interface with TTL levels
- High-impedance outputs when V<sub>CC</sub> = 0 V
- I<sub>OFF</sub> circuitry provides partial Power-down mode operation
- Complies with JEDEC standard:
  - JESD8-7A (1.65 V to 1.95 V)
  - JESD8-5A (2.3 V to 2.7 V)
  - JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

# 3. Ordering information

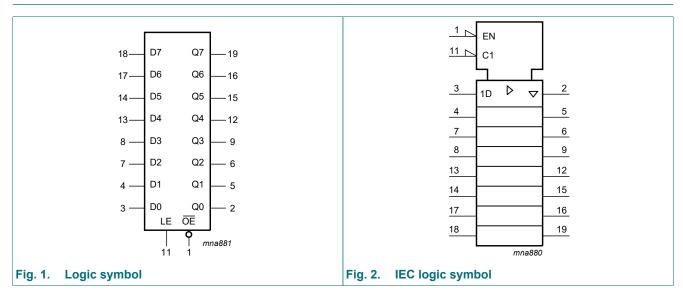
**Table 1. Ordering information** 

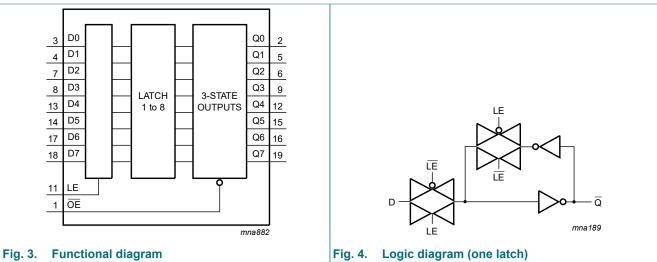
| Type number | Package           |          |                                                                                                                                |          |  |  |  |  |  |  |  |
|-------------|-------------------|----------|--------------------------------------------------------------------------------------------------------------------------------|----------|--|--|--|--|--|--|--|
|             | Temperature range | Name     | Description                                                                                                                    | Version  |  |  |  |  |  |  |  |
| 74LVC373AD  | -40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm                                                                  | SOT163-1 |  |  |  |  |  |  |  |
| 74LVC373APW | -40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads; body width 4.4 mm                                                         | SOT360-1 |  |  |  |  |  |  |  |
| 74LVC373ABQ | -40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 × 4.5 × 0.85 mm | SOT764-1 |  |  |  |  |  |  |  |

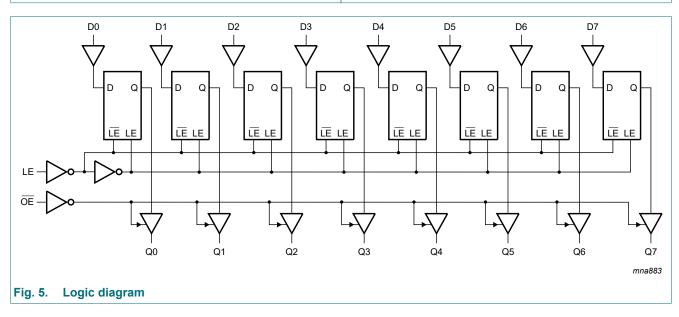


Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

# 4. Functional diagram



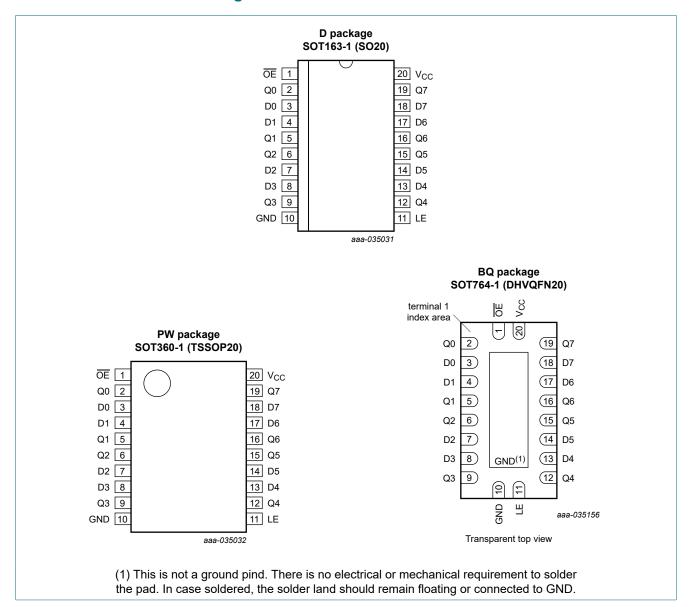




#### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

# 5. Pinning information

### 5.1. Pinning



### 5.2. Pin description

Table 2. Pin description

| Table 2.1 III accomption       |                            |                                  |
|--------------------------------|----------------------------|----------------------------------|
| Symbol                         | Pin                        | Description                      |
| ŌE                             | 1                          | output enable input (active LOW) |
| LE                             | 11                         | latch enable input (active HIGH) |
| D0, D1, D2, D3, D4, D5, D6, D7 | 3, 4, 7, 8, 13, 14, 17, 18 | data input                       |
| Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7 | 2, 5, 6, 9, 12, 15, 16, 19 | latch output                     |
| GND                            | 10                         | ground (0 V)                     |
| V <sub>CC</sub>                | 20                         | supply voltage                   |
| GND                            | 10                         | ground (0 V)                     |

#### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

# 6. Functional description

#### **Table 3. Functional table**

 $H = HIGH \ voltage \ level; \ h = HIGH \ voltage \ level \ one \ set-up \ time \ prior \ to \ the \ HIGH-to-LOW \ LE \ transition;$ 

 $L = LOW \ voltage \ level; \ l = LOW \ voltage \ level \ one \ set-up \ time \ prior \ to \ the \ HIGH-to-LOW \ LE \ transition;$ 

Z = High-impedance OFF-state.

| Operating modes            | Input |    | Internal latch | Output |    |
|----------------------------|-------|----|----------------|--------|----|
|                            | OE    | LE | Dn             |        | Qn |
| Enable and read register   | L     | Н  | L              | L      | L  |
| (transparent mode)         | L     | Н  | Н              | Н      | Н  |
| Latch and read register    | L     | L  | I              | L      | L  |
|                            | L     | L  | h              | Н      | Н  |
| Latch register and disable | Н     | L  | I              | L      | Z  |
| outputs                    | Н     | L  | h              | Н      | Z  |

# 7. Limiting values

#### **Table 4. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

| Symbol           | Parameter               | Conditions                     |     | Min  | Max                   | Unit |
|------------------|-------------------------|--------------------------------|-----|------|-----------------------|------|
| V <sub>CC</sub>  | supply voltage          |                                |     | -0.5 | +6.5                  | V    |
| I <sub>IK</sub>  | input clamping current  | V <sub>I</sub> < 0             |     | -50  | -                     | mA   |
| VI               | input voltage           |                                | [1] | -0.5 | +6.5                  | V    |
| I <sub>OK</sub>  | output clamping current | $V_O > V_{CC}$ or $V_O < 0$    |     | -    | ±50                   | mA   |
| Vo               | output voltage          | HIGH or LOW-state              | [2] | -0.5 | V <sub>CC</sub> + 0.5 | V    |
|                  |                         | 3-state                        | [2] | -0.5 | +6.5                  | V    |
| Io               | output current          | $V_O = 0 V \text{ to } V_{CC}$ |     | -    | ±50                   | mA   |
| I <sub>CC</sub>  | supply current          |                                |     | -    | 100                   | mA   |
| $I_{GND}$        | ground current          |                                |     | -100 | -                     | mA   |
| T <sub>stg</sub> | storage temperature     |                                |     | -65  | +150                  | °C   |
| P <sub>tot</sub> | total power dissipation | $T_{amb}$ = -40 °C to +125 °C  | [3] | -    | 500                   | mW   |

<sup>[1]</sup> The minimum input voltage ratings may be exceeded if the input current ratings are observed.

<sup>[2]</sup> The output voltage ratings may be exceeded if the output current ratings are observed.

<sup>[3]</sup> For SOT163-1 (SO20) package: P<sub>tot</sub> derates linearly with 12.3 mW/K above 109 °C. For SOT360-1 (TSSOP20) package: P<sub>tot</sub> derates linearly with 10.0 mW/K above 100 °C. For SOT764-1 (DHVQFN20) package: P<sub>tot</sub> derates linearly with 12.9 mW/K above 111 °C.

### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

# 8. Recommended operating conditions

Table 5. Recommended operating conditions

| Symbol           | Parameter                           | Conditions                        | Min  | Тур | Max             | Unit |
|------------------|-------------------------------------|-----------------------------------|------|-----|-----------------|------|
| V <sub>CC</sub>  | supply voltage                      |                                   | 1.65 | -   | 3.6             | V    |
|                  |                                     | functional                        | 1.2  | -   | -               | V    |
| VI               | input voltage                       |                                   | 0    | -   | 5.5             | V    |
| Vo               | output voltage                      | HIGH or LOW-state                 | 0    | -   | V <sub>CC</sub> | V    |
|                  |                                     | 3-state                           | 0    | -   | 5.5             | V    |
| T <sub>amb</sub> | ambient temperature                 | in free air                       | -40  | -   | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 1.65 V to 2.7 V | 0    | -   | 20              | ns/V |
|                  |                                     | V <sub>CC</sub> = 2.7 V to 3.6 V  | 0    | -   | 10              | ns/V |

# 9. Static characteristics

#### **Table 6. Static characteristics**

At recommended operating conditions. Voltages are referenced to GND (ground = 0 V).

| Symbol          | Parameter                        | Conditions                                                                             | -40                    | °C to +8 | 5 °C                   | -40 °C to              | Unit                   |    |
|-----------------|----------------------------------|----------------------------------------------------------------------------------------|------------------------|----------|------------------------|------------------------|------------------------|----|
|                 |                                  |                                                                                        | Min                    | Typ [1]  | Max                    | Min                    | Max                    |    |
| V <sub>IH</sub> | HIGH-level                       | V <sub>CC</sub> = 1.2 V                                                                | 1.08                   | -        | -                      | 1.08                   | -                      | V  |
|                 | input voltage                    | V <sub>CC</sub> = 1.65 V to 1.95 V                                                     | 0.65 × V <sub>CC</sub> | -        | -                      | 0.65 × V <sub>CC</sub> | -                      | V  |
|                 |                                  | V <sub>CC</sub> = 2.3 V to 2.7 V                                                       | 1.7                    | -        | -                      | 1.7                    | -                      | V  |
|                 | V <sub>CC</sub> = 2.7 V to 3.6 V |                                                                                        | 2.0                    | -        | -                      | 2.0                    | -                      | V  |
| V <sub>IL</sub> | LOW-level                        | V <sub>CC</sub> = 1.2 V                                                                | -                      | -        | 0.12                   | -                      | 0.12                   | V  |
| input voltage   |                                  | V <sub>CC</sub> = 1.65 V to 1.95 V                                                     | -                      | -        | 0.35 × V <sub>CC</sub> | -                      | 0.35 × V <sub>CC</sub> | V  |
|                 |                                  | V <sub>CC</sub> = 2.3 V to 2.7 V                                                       | -                      | -        | 0.7                    | -                      | 0.7                    | V  |
|                 |                                  | V <sub>CC</sub> = 2.7 V to 3.6 V                                                       | -                      | -        | 0.8                    | -                      | 0.8                    | V  |
| V <sub>OH</sub> | HIGH-level                       | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                    |                        |          |                        |                        |                        |    |
|                 | output voltage                   | I <sub>O</sub> = -100 μA;<br>V <sub>CC</sub> = 1.65 V to 3.6 V                         | V <sub>CC</sub> - 0.2  | -        | -                      | V <sub>CC</sub> - 0.3  | -                      | V  |
|                 |                                  | I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V                                       | 1.2                    | -        | -                      | 1.05                   | -                      | V  |
|                 |                                  | $I_{O}$ = -8 mA; $V_{CC}$ = 2.3 V                                                      | 1.8                    | -        | -                      | 1.65                   | -                      | V  |
|                 |                                  | I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V                                       | 2.2                    | -        | -                      | 2.05                   | -                      | V  |
|                 |                                  | I <sub>O</sub> = -18 mA; V <sub>CC</sub> = 3.0 V                                       | 2.4                    | -        | -                      | 2.25                   | -                      | V  |
|                 |                                  | I <sub>O</sub> = -24 mA; V <sub>CC</sub> = 3.0 V                                       | 2.2                    | -        | _                      | 2.0                    | -                      | V  |
| V <sub>OL</sub> | LOW-level                        | $V_I = V_{IH}$ or $V_{IL}$                                                             |                        |          |                        |                        |                        |    |
|                 | output voltage                   | I <sub>O</sub> = 100 μA;<br>V <sub>CC</sub> = 1.65 V to 3.6 V                          | -                      | -        | 0.2                    | -                      | 0.3                    | V  |
|                 |                                  | I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V                                        | -                      | -        | 0.45                   | -                      | 0.65                   | V  |
|                 |                                  | I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V                                         | -                      | -        | 0.6                    | -                      | 0.8                    | V  |
|                 |                                  | $I_{O}$ = 12 mA; $V_{CC}$ = 2.7 V                                                      | -                      | -        | 0.4                    | -                      | 0.6                    | V  |
|                 |                                  | $I_O = 24 \text{ mA}; V_{CC} = 3.0 \text{ V}$                                          | -                      | -        | 0.55                   | -                      | 0.8                    | V  |
| I <sub>I</sub>  | input leakage<br>current         | $V_{CC} = 3.6 \text{ V}; V_I = 5.5 \text{ V or GND}$                                   | -                      | ±0.1     | ±5                     | -                      | ±20                    | μΑ |
| l <sub>OZ</sub> | OFF-state output current         | $V_I = V_{IH} \text{ or } V_{IL}; V_{CC} = 3.6 \text{ V}; V_O = 5.5 \text{ V or GND};$ | -                      | ±0.1     | ±5                     | -                      | ±20                    | μΑ |

**Product data sheet** 

### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

| Symbol           | Parameter                      | Conditions                                                                         | -40 | °C to +8 | 5 °C | -40 °C to | Unit |    |
|------------------|--------------------------------|------------------------------------------------------------------------------------|-----|----------|------|-----------|------|----|
|                  |                                |                                                                                    | Min | Typ [1]  | Max  | Min       | Max  |    |
| l <sub>OFF</sub> | power-off<br>leakage<br>supply | $V_{CC} = 0 \text{ V}; V_1 \text{ or } V_0 = 5.5 \text{ V}$                        | -   | ±0.1     | ±10  | -         | ±20  | μА |
| I <sub>CC</sub>  |                                | $V_{CC} = 3.6 \text{ V}; V_{I} = V_{CC} \text{ or GND};$<br>$I_{O} = 0 \text{ A}$  | -   | 0.1      | 10   | -         | 40   | μΑ |
| ΔI <sub>CC</sub> |                                | per input pin; $V_{CC}$ = 2.7<br>V to 3.6 V; $V_I$ = $V_{CC}$ - 0.6 V; $I_O$ = 0 A | -   | 5        | 500  | -         | 5000 | μА |
| C <sub>I</sub>   | input<br>capacitance           | $V_{CC} = 0 \text{ V to } 3.6 \text{ V};$<br>$V_I = \text{GND to } V_{CC}$         | -   | 5.0      | -    | -         | -    | pF |

<sup>[1]</sup> All typical values are measured at  $V_{CC}$  = 3.3 V (unless stated otherwise) and  $T_{amb}$  = 25 °C.

# 10. Dynamic characteristics

**Table 7. Dynamic characteristics** 

Voltages are referenced to GND (ground = 0 V). For test circuit see Fig. 10.

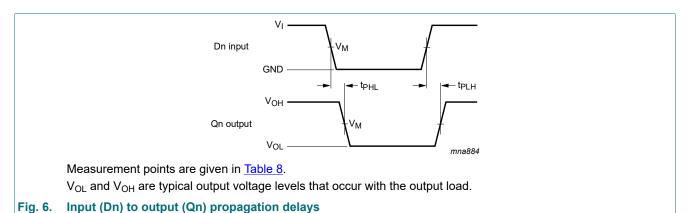
| Symbol           | Parameter         | Conditions                         | -40 | °C to +8 | 5 °C | -40 °C to | +125 °C | Unit |
|------------------|-------------------|------------------------------------|-----|----------|------|-----------|---------|------|
|                  |                   |                                    | Min | Typ[1]   | Max  | Min       | Max     |      |
| t <sub>pd</sub>  | propagation delay | Dn to Qn; see Fig. 6 [2]           |     |          |      |           |         |      |
|                  |                   | V <sub>CC</sub> = 1.2 V            | -   | 14       | -    | -         | -       | ns   |
|                  |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 1.5 | 6.5      | 15.8 | 1.5       | 18.2    | ns   |
|                  |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.0 | 3.4      | 8.2  | 1.0       | 9.4     | ns   |
|                  |                   | V <sub>CC</sub> = 2.7 V            | 1.5 | 3.4      | 7.8  | 1.5       | 10.0    | ns   |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.5 | 2.9      | 6.8  | 1.5       | 8.5     | ns   |
|                  |                   | LE to Qn; see Fig. 7 [2]           |     |          |      |           |         |      |
|                  |                   | V <sub>CC</sub> = 1.2 V            | -   | 16       | -    | -         | -       | ns   |
|                  |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.2 | 7.3      | 16.8 | 2.2       | 19.3    | ns   |
|                  |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.5 | 3.9      | 8.6  | 1.5       | 10.0    | ns   |
|                  |                   | V <sub>CC</sub> = 2.7 V            | 1.5 | 3.5      | 8.2  | 1.5       | 10.5    | ns   |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.5 | 3.3      | 7.2  | 1.5       | 9.0     | ns   |
| t <sub>en</sub>  | enable time       | OE to Qn; see Fig. 8 [2]           |     |          |      |           |         |      |
|                  |                   | V <sub>CC</sub> = 1.2 V            | -   | 17       | -    | -         | -       | ns   |
|                  |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 1.5 | 6.8      | 17.6 | 1.5       | 20.3    | ns   |
|                  |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.5 | 3.8      | 9.7  | 1.5       | 11.2    | ns   |
|                  |                   | V <sub>CC</sub> = 2.7 V            | 1.5 | 3.8      | 8.7  | 1.5       | 11.0    | ns   |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.5 | 3.1      | 7.7  | 1.5       | 10.0    | ns   |
| t <sub>dis</sub> | disable time      | OE to Qn; see Fig. 8 [2]           |     |          |      |           |         |      |
|                  |                   | V <sub>CC</sub> = 1.2 V            | -   | 8.0      | -    | -         | -       | ns   |
|                  |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.3 | 4.3      | 10.3 | 2.3       | 11.9    | ns   |
|                  |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.0 | 2.4      | 5.8  | 1.0       | 6.8     | ns   |
|                  |                   | V <sub>CC</sub> = 2.7 V            | 1.5 | 3.2      | 7.1  | 1.5       | 9.0     | ns   |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.5 | 3.0      | 6.1  | 1.5       | 8.0     | ns   |

#### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

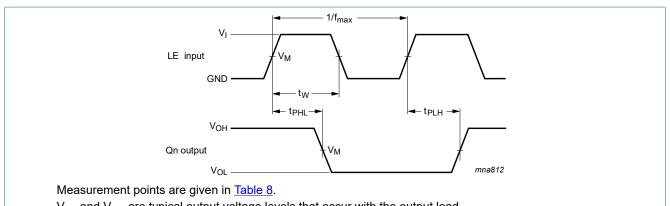
| Symbol             | Parameter         | Conditions                            | -40 | °C to +8 | 5 °C | -40 °C to | Unit |    |
|--------------------|-------------------|---------------------------------------|-----|----------|------|-----------|------|----|
|                    |                   |                                       | Min | Typ[1]   | Max  | Min       | Max  |    |
| t <sub>W</sub>     | pulse width       | LE HIGH; see Fig. 7                   |     |          |      |           |      |    |
|                    |                   | V <sub>CC</sub> = 1.65 V to 1.95 V    | 5.0 | -        | -    | 5.0       | -    | ns |
|                    |                   | V <sub>CC</sub> = 2.3 V to 2.7 V      | 4.0 | -        | -    | 4.0       | -    | ns |
|                    |                   | V <sub>CC</sub> = 2.7 V               | 3.0 | -        | -    | 3.0       | -    | ns |
|                    |                   | V <sub>CC</sub> = 3.0 V to 3.6 V      | 3.0 | 1.5      | -    | 3.0       | -    | ns |
| t <sub>su</sub>    | set-up time       | Dn to LE; see Fig. 9                  |     |          |      |           |      |    |
|                    |                   | V <sub>CC</sub> = 1.65 V to 1.95 V    | 4.0 | -        | -    | 4.0       | -    | ns |
|                    |                   | V <sub>CC</sub> = 2.3 V to 2.7 V      | 3.0 | -        | -    | 3.0       | -    | ns |
|                    |                   | V <sub>CC</sub> = 2.7 V               | 2.0 | -        | -    | 2.0       | -    | ns |
|                    |                   | V <sub>CC</sub> = 3.0 V to 3.6 V      | 2.0 | 0.0      | -    | 2.0       | -    | ns |
| t <sub>h</sub>     | hold time         | Dn to LE; see Fig. 9                  |     |          |      |           |      |    |
|                    |                   | V <sub>CC</sub> = 1.65 V to 1.95 V    | 3.0 | -        | -    | 3.0       | -    | ns |
|                    |                   | V <sub>CC</sub> = 2.3 V to 2.7 V      | 2.0 | -        | -    | 2.0       | -    | ns |
|                    |                   | V <sub>CC</sub> = 2.7 V               | 1.5 | -        | -    | 1.5       | -    | ns |
|                    |                   | V <sub>CC</sub> = 3.0 V to 3.6 V      | 1.5 | 0.3      | -    | 1.5       | -    | ns |
| t <sub>sk(0)</sub> | output skew time  | V <sub>CC</sub> = 3.0 V to 3.6 V      | -   | -        | 1.0  | -         | 1.5  | ns |
| C <sub>PD</sub>    | power dissipation | per latch; $V_I = GND$ to $V_{CC}$ [4 | 1   |          |      |           |      |    |
|                    | capacitance       | V <sub>CC</sub> = 1.65 V to 1.95 V    | -   | 16.6     | -    | -         | -    | pF |
|                    |                   | V <sub>CC</sub> = 2.3 V to 2.7 V      | -   | 19.2     | -    | -         | -    | pF |
|                    |                   | V <sub>CC</sub> = 3.0 V to 3.6 V      | -   | 21.6     | -    | -         | -    | pF |

- [1] Typical values are measured at  $T_{amb}$  = 25 °C and  $V_{CC}$  = 1.2 V, 1.8 V, 2.5 V, 2.7 V and 3.3 V respectively.
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.
  - $t_{\text{en}}$  is the same as  $t_{\text{PZL}}$  and  $t_{\text{PZH}}$ .
  - $t_{\mbox{\scriptsize dis}}$  is the same as  $t_{\mbox{\scriptsize PLZ}}$  and  $t_{\mbox{\scriptsize PHZ}}.$
- [3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.
- 4]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu W$ ).
  - $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma (C_L \times V_{CC}^2 \times f_o)$  where:
  - $f_i$  = input frequency in MHz;  $f_o$  = output frequency in MHz
  - C<sub>L</sub> = output load capacitance in pF;
  - V<sub>CC</sub> = supply voltage in V;
  - N = number of inputs switching;
  - $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

### 10.1. Waveforms and test circuit



#### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state



 $V_{\mbox{\scriptsize OL}}$  and  $V_{\mbox{\scriptsize OH}}$  are typical output voltage levels that occur with the output load.

Fig. 7. Latch Enable input (LE) pulse width, the latch enable input to output (Qn) propagation delays

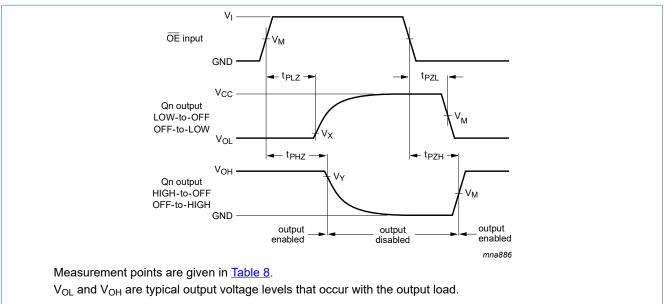
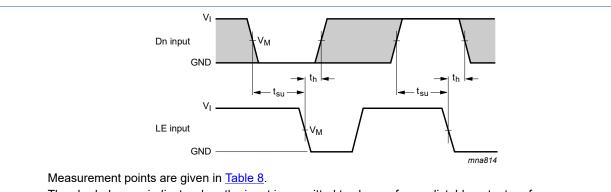


Fig. 8. 3-state enable and disable times



The shaded areas indicate when the input is permitted to change for predictable output performance.

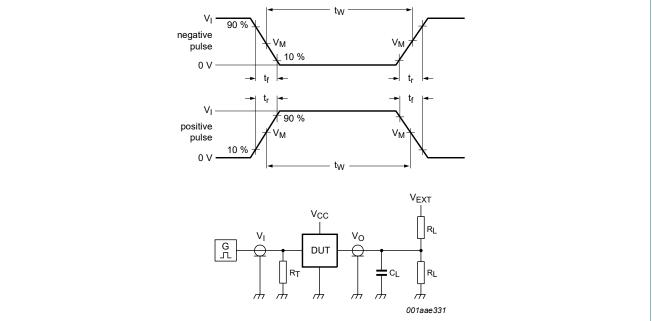
V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage levels that occur with the output load.

Fig. 9. Data set-up and hold times for the Dn input to the LE input

#### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

**Table 8. Measurement points** 

| Supply voltage   | Input           |                       | Output                | Output                   |                          |  |  |  |  |  |  |
|------------------|-----------------|-----------------------|-----------------------|--------------------------|--------------------------|--|--|--|--|--|--|
| V <sub>CC</sub>  | VI              | V <sub>M</sub>        | V <sub>M</sub>        | V <sub>X</sub>           | V <sub>Y</sub>           |  |  |  |  |  |  |
| 1.2 V            | V <sub>CC</sub> | 0.5 x V <sub>CC</sub> | 0.5 x V <sub>CC</sub> | V <sub>OL</sub> + 0.15 V | V <sub>OH</sub> - 0.15 V |  |  |  |  |  |  |
| 1.65 V to 1.95 V | V <sub>CC</sub> | 0.5 x V <sub>CC</sub> | 0.5 x V <sub>CC</sub> | V <sub>OL</sub> + 0.15 V | V <sub>OH</sub> - 0.15 V |  |  |  |  |  |  |
| 2.3 V to 2.7 V   | V <sub>CC</sub> | 0.5 x V <sub>CC</sub> | 0.5 x V <sub>CC</sub> | V <sub>OL</sub> + 0.15 V | V <sub>OH</sub> - 0.15 V |  |  |  |  |  |  |
| 2.7 V            | 2.7 V           | 1.5 V                 | 1.5 V                 | V <sub>OL</sub> + 0.3 V  | V <sub>OH</sub> - 0.3 V  |  |  |  |  |  |  |
| 3.0 V to 3.6 V   | 2.7 V           | 1.5 V                 | 1.5 V                 | V <sub>OL</sub> + 0.3 V  | V <sub>OH</sub> - 0.3 V  |  |  |  |  |  |  |



Test data is given in Table 9.

Definitions for test circuit:

R<sub>L</sub> = Load resistance;

C<sub>L</sub> = Load capacitance including jig and probe capacitance;

R<sub>T</sub> = Termination resistance should be equal to output impedance Z<sub>o</sub> of the pulse generator;

 $V_{\mathsf{EXT}}$  = External voltage for measuring switching times.

Fig. 10. Test circuit for measuring switching times

Table 9. Test data

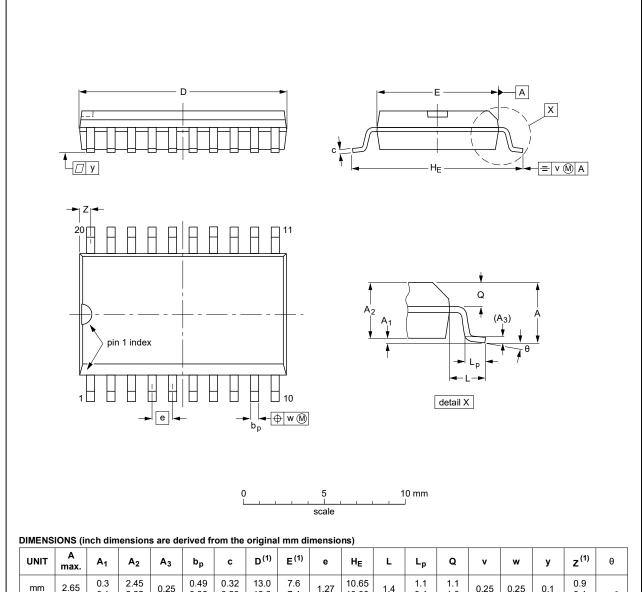
| Supply voltage   | Input           |                                 | Load           |                | V <sub>EXT</sub>                    |                                     |                                     |  |  |
|------------------|-----------------|---------------------------------|----------------|----------------|-------------------------------------|-------------------------------------|-------------------------------------|--|--|
|                  | V <sub>I</sub>  | t <sub>r</sub> , t <sub>f</sub> | C <sub>L</sub> | R <sub>L</sub> | t <sub>PLH</sub> , t <sub>PHL</sub> | t <sub>PLZ</sub> , t <sub>PZL</sub> | t <sub>PHZ</sub> , t <sub>PZH</sub> |  |  |
| 1.2 V            | V <sub>CC</sub> | ≤ 2 ns                          | 30 pF          | 1 kΩ           | open                                | 2 x V <sub>CC</sub>                 | GND                                 |  |  |
| 1.65 V to 1.95 V | V <sub>CC</sub> | ≤ 2 ns                          | 30 pF          | 1 kΩ           | open                                | 2 x V <sub>CC</sub>                 | GND                                 |  |  |
| 2.3 V to 2.7 V   | V <sub>CC</sub> | ≤ 2 ns                          | 30 pF          | 500 Ω          | open                                | 2 x V <sub>CC</sub>                 | GND                                 |  |  |
| 2.7 V            | 2.7 V           | ≤ 2.5 ns                        | 50 pF          | 500 Ω          | open                                | 2 x V <sub>CC</sub>                 | GND                                 |  |  |
| 3.0 V to 3.6 V   | 2.7 V           | ≤ 2.5 ns                        | 50 pF          | 500 Ω          | open                                | 2 x V <sub>CC</sub>                 | GND                                 |  |  |

### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

# 11. Package outline

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



| UNIT   | A<br>max. | A <sub>1</sub> | A <sub>2</sub> | <b>A</b> <sub>3</sub> | bp             | С              | D <sup>(1)</sup> | E <sup>(1)</sup> | е    | HE             | L     | Lp             | Q              | v    | w    | у     | z <sup>(1)</sup> | θ  |
|--------|-----------|----------------|----------------|-----------------------|----------------|----------------|------------------|------------------|------|----------------|-------|----------------|----------------|------|------|-------|------------------|----|
| mm     | 2.65      | 0.3<br>0.1     | 2.45<br>2.25   | 0.25                  | 0.49<br>0.36   | 0.32<br>0.23   | 13.0<br>12.6     | 7.6<br>7.4       | 1.27 | 10.65<br>10.00 | 1.4   | 1.1<br>0.4     | 1.1<br>1.0     | 0.25 | 0.25 | 0.1   | 0.9<br>0.4       | 8° |
| inches | 0.1       | 0.012<br>0.004 | 0.096<br>0.089 | 0.01                  | 0.019<br>0.014 | 0.013<br>0.009 | 0.51<br>0.49     | 0.30<br>0.29     | 0.05 | 0.419<br>0.394 | 0.055 | 0.043<br>0.016 | 0.043<br>0.039 | 0.01 | 0.01 | 0.004 | 0.035<br>0.016   | 0° |

#### Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

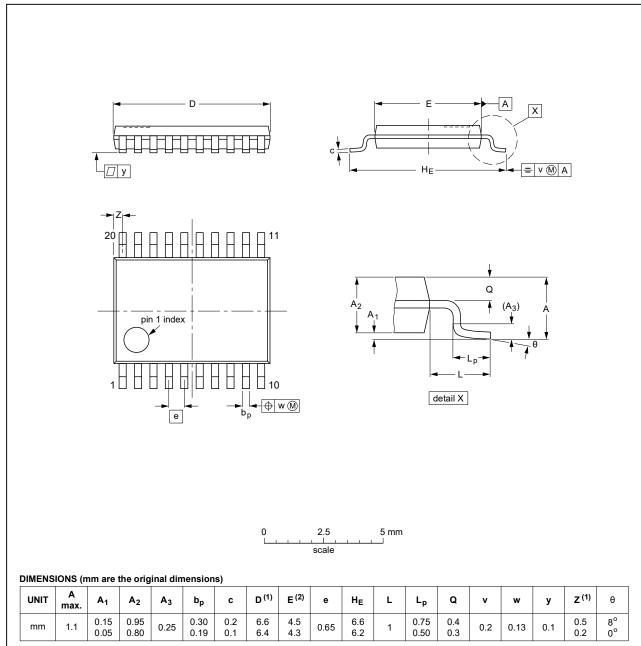
| OUTLINE<br>VERSION | REFERENCES |        |       | EUROPEAN | ISSUE DATE |                                 |
|--------------------|------------|--------|-------|----------|------------|---------------------------------|
|                    | IEC        | JEDEC  | JEITA |          | PROJECTION | ISSUE DATE                      |
| SOT163-1           | 075E04     | MS-013 |       |          |            | <del>99-12-27</del><br>03-02-19 |

Fig. 11. Package outline SOT163-1 (SO20)

#### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1



#### Notes

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

| OUTLINE<br>VERSION | REFERENCES |        |       | EUROPEAN | ISSUE DATE |                                 |
|--------------------|------------|--------|-------|----------|------------|---------------------------------|
|                    | IEC        | JEDEC  | JEITA |          | PROJECTION | ISSUE DATE                      |
| SOT360-1           |            | MO-153 |       |          |            | <del>99-12-27</del><br>03-02-19 |

Fig. 12. Package outline SOT360-1 (TSSOP20)

#### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

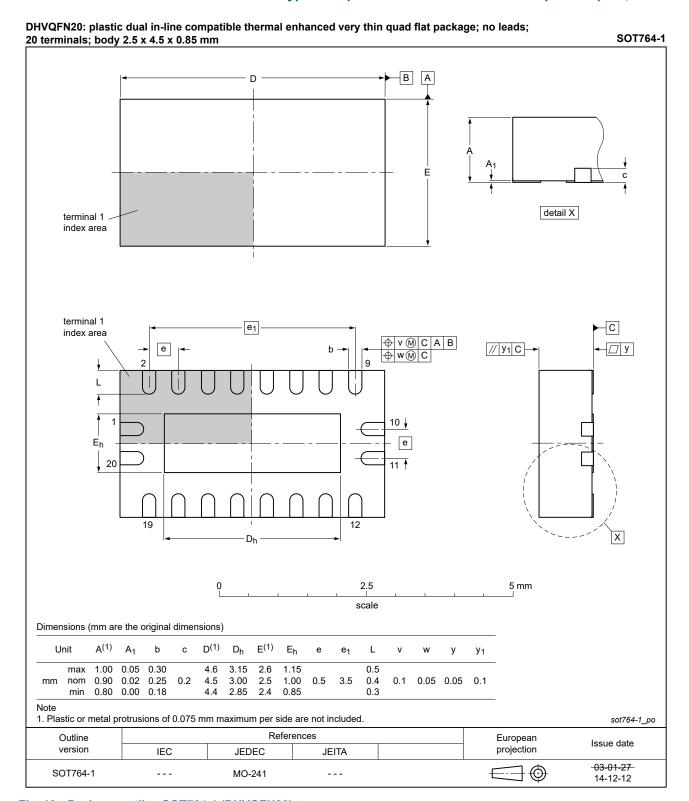


Fig. 13. Package outline SOT764-1 (DHVQFN20)

### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

# 12. Abbreviations

#### **Table 10. Abbreviations**

| Acronym | Description                             |
|---------|-----------------------------------------|
| CDM     | Charged Device Model                    |
| CMOS    | Complementary Metal Oxide Semiconductor |
| DUT     | Device Under Test                       |
| ESD     | ElectroStatic Discharge                 |
| HBM     | Human Body Model                        |
| TTL     | Transistor-Transistor Logic             |

# 13. Revision history

### Table 11. Revision history

| Document ID    | Release date                           | Data sheet status                                                                                                                                                                                    | Change notice | Supersedes    |  |  |
|----------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|--|--|
| 74LVC373A v.6  | 202308028                              | Product data sheet                                                                                                                                                                                   | -             | 74LVC373A v.5 |  |  |
| Modifications: | Section 2: I                           | <u>Section 2</u> : ESD specification updated according to the latest JEDEC standard.                                                                                                                 |               |               |  |  |
| 74LVC373A v.5  | 20210827                               | 20210827 Product data sheet - 74LVC373A v.4                                                                                                                                                          |               |               |  |  |
| Modifications: | Type numb                              | Type number 74LVC373ADB (SOT339-1/SSOP20) removed.                                                                                                                                                   |               |               |  |  |
| 74LVC373A v.4  | 20200824                               | Product data sheet                                                                                                                                                                                   | -             | 74LVC373A v.3 |  |  |
| Modifications: | guidelines of Legal texts  Table 4: De | guidelines of Nexperia.  • Legal texts have been adapted to the new company name where appropriate.  • Table 4: Derating values for P <sub>tot</sub> total power dissipation have been updated.      |               |               |  |  |
| 74LVC373A v.3  | 20121122                               | Product data sheet                                                                                                                                                                                   | -             | 74LVC373A v.2 |  |  |
| Modifications: | guidelines o Legal texts               | guidelines of NXP Semiconductors.  Legal texts have been adapted to the new company name where appropriate.  Table 4, Table 5, Table 6, Table 7, Table 8 and Table 9: values added for lower voltage |               |               |  |  |
| 74LVC373A v.2  | 20030519                               | Product specification                                                                                                                                                                                | -             | 74LVC373A v.1 |  |  |
| 74LVC373A v.1  | 19980729                               | Product specification                                                                                                                                                                                | -             | -             |  |  |

#### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

### 14. Legal information

#### Data sheet status

| Document status [1][2]         | Product<br>status [3] | Definition                                                                            |
|--------------------------------|-----------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet   | Development           | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification         | This document contains data from the preliminary specification.                       |
| Product [short]<br>data sheet  | Production            | This document contains the product specification.                                     |

- Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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### Octal D-type transparent latch with 5 V tolerant inputs/outputs; 3-state

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