

# 74AHC573; 74AHCT573

Octal D-type transparent latch; 3-state

Rev. 7 — 8 November 2011

Product data sheet

## 1. General description

The 74AHC573; 74AHCT573 is a high-speed Si-gate CMOS device and is pin compatible with Low-power Schottky TTL (LSTTL). It is specified in compliance with JEDEC standard No. 7A.

The 74AHC573; 74AHCT573 consists of eight D-type transparent latches featuring separate D-type inputs for each latch and 3-state true outputs for bus oriented applications. A latch enable input (LE) and an output enable input ( $\overline{OE}$ ) are common to all latches.

When pin LE is HIGH, data at the Dn inputs enters the latches. In this condition the latches are transparent, i.e. a latch output will change state each time its corresponding Dn input changes. When pin LE is LOW, the latches store the information that is present at the Dn inputs, after a set-up time preceding the HIGH-to-LOW transition of LE.

When pin  $\overline{OE}$  is LOW, the contents of the 8 latches are available at the outputs. When pin  $\overline{OE}$  is HIGH, the outputs go to the high-impedance OFF-state. Operation of the  $\overline{OE}$  input does not affect the state of the latches.

The 74AHC573; 74AHCT573 is functionally identical to the 74AHC373; 74AHCT373, but has a different pin arrangement.

## 2. Features and benefits

- Balanced propagation delays
- All inputs have a Schmitt trigger action
- Common 3-state output enable input
- Functionally identical to the 74AHC373; 74AHCT373
- Inputs accept voltages higher than  $V_{CC}$
- Input levels:
  - ◆ For 74AHC573: CMOS input level
  - ◆ For 74AHCT573: TTL input level
- ESD protection:
  - ◆ HBM EIA/JESD22-A114E exceeds 2000 V
  - ◆ MM EIA/JESD22-A115-A exceeds 200 V
  - ◆ CDM EIA/JESD22-C101C exceeds 1000 V
- Multiple package options
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$



## 3. Ordering information

Table 1. Ordering information

| Type number      | Package           |          |   | Version  |
|------------------|-------------------|----------|---|----------|
|                  | Temperature range | Name     | Description   |          |
| <b>74AHC573</b>  |                   |          |   |          |
| 74AHC573D        | -40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm   | SOT163-1 |
| 74AHC573PW       | -40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm   | SOT360-1 |
| 74AHC573BQ       | -40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced<br>very thin quad flat package no leads; 20 terminals;<br>body 2.5 × 4.5 × 0.85 mm | SOT764-1 |
| <b>74AHCT573</b> |                   |          |   |          |
| 74AHCT573D       | -40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm   | SOT163-1 |
| 74AHCT573PW      | -40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm   | SOT360-1 |
| 74AHCT573BQ      | -40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced<br>very thin quad flat package no leads; 20 terminals;<br>body 2.5 × 4.5 × 0.85 mm | SOT764-1 |

## 4. Functional diagram

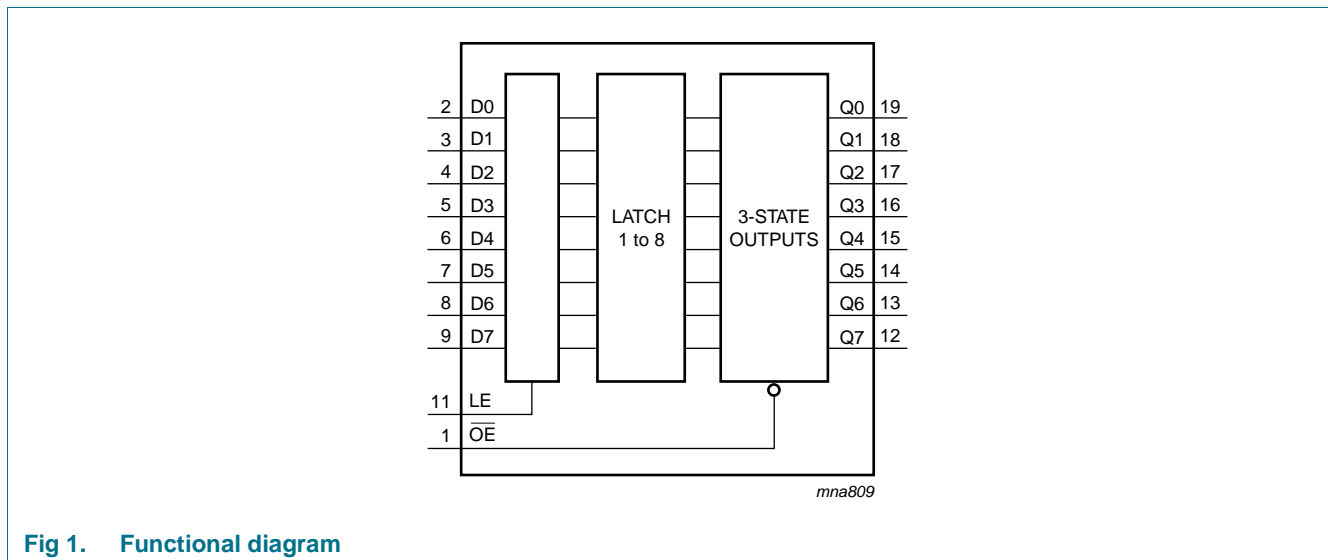


Fig 1. Functional diagram

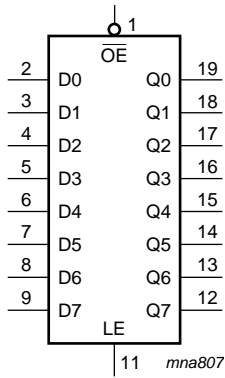


Fig 2. Logic symbol

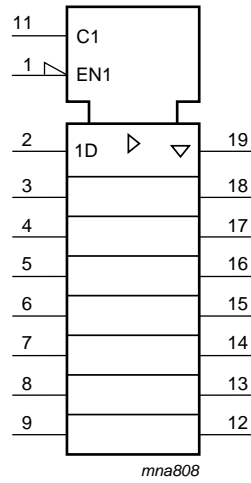


Fig 3. IEC logic symbol

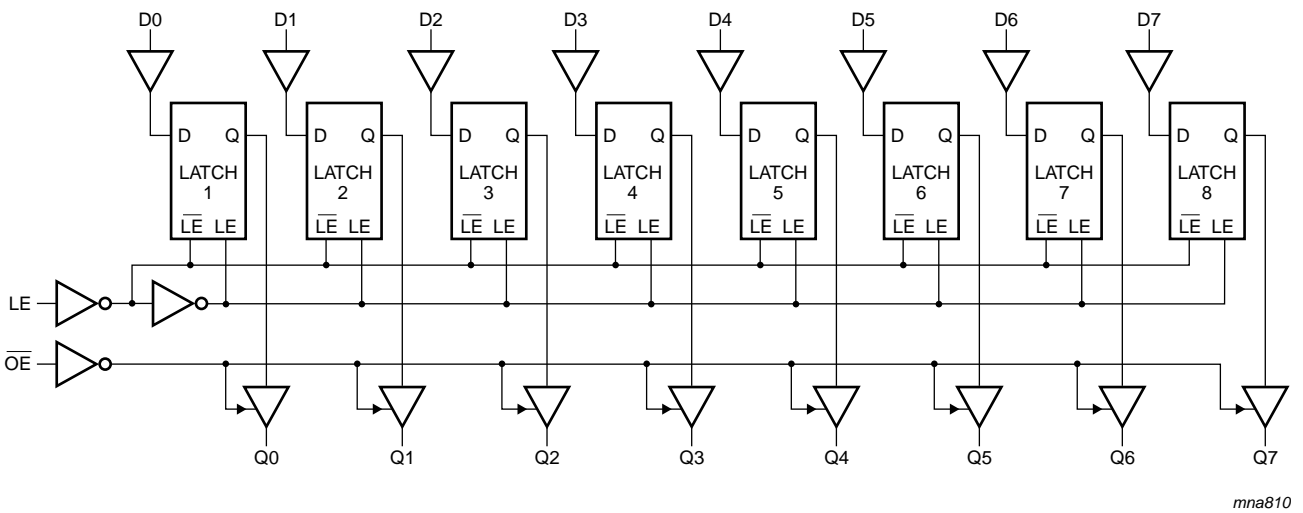
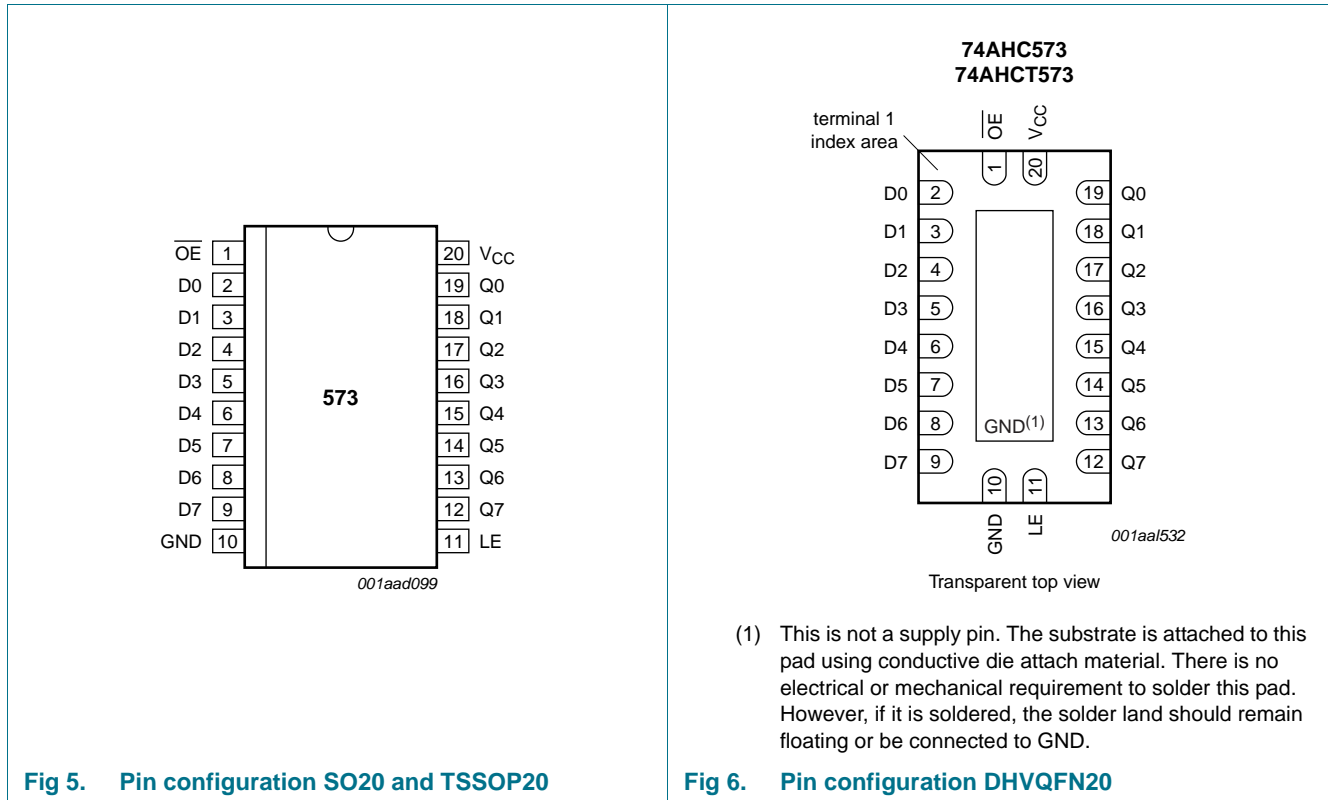


Fig 4. Logic diagram

## 5. Pinning information

### 5.1 Pinning



### 5.2 Pin description

Table 2. Pin description

| Symbol          | Pin                            | Description                      |
|-----------------|--------------------------------|----------------------------------|
| $\overline{OE}$ | 1                              | output enable input (active LOW) |
| D0 to D7        | 2, 3, 4, 5, 6, 7, 8, 9         | data input                       |
| GND             | 10                             | ground (0 V)                     |
| LE              | 11                             | latch enable (active HIGH)       |
| Q0 to Q7        | 19, 18, 17, 16, 15, 14, 13, 12 | data output                      |
| V <sub>CC</sub> | 20                             | supply voltage                   |

## 6. Functional description

Table 3. Function table<sup>[1]</sup>

| Operating mode                              | Input |    |    | Internal latch | Output<br>Qn |
|---|-------|----|----|----------------|--------------|
|   | OE    | LE | Dn |                |              |
| Enable and read register (transparent mode) | L     | H  | L  | L              | L            |
|   |       |    | H  | H              | H            |
| Latch and read register                     | L     | L  | l  | L              | L            |
|   |       |    | h  | H              | H            |
| Latch register and disable outputs          | H     | L  | l  | L              | Z            |
|   |       |    | h  | H              | Z            |

- [1] 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.

## 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 |
|-----------|-------------------------|--|--------------------|------|------|
| $V_{CC}$  | supply voltage          |  | -0.5               | +7.0 | V    |
| $V_I$     | input voltage           |  | -0.5               | +7.0 | V    |
| $I_{IK}$  | input clamping current  | $V_I < -0.5$ V                           | <sup>[1]</sup> -20 | -    | mA   |
| $I_{OK}$  | output clamping current | $V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V | <sup>[1]</sup> -20 | +20  | mA   |
| $I_O$     | output current          | $V_O = -0.5$ V to $(V_{CC} + 0.5$ V)     | -25                | +25  | mA   |
| $I_{CC}$  | supply current          |  | -                  | +75  | mA   |
| $I_{GND}$ | ground current          |  | -75                | -    | mA   |
| $T_{stg}$ | storage temperature     |  | -65                | +150 | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40$ °C to $+125$ °C          | <sup>[2]</sup> -   | 500  | mW   |

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

- [2] For SO20 packages: above 70 °C the value of  $P_{tot}$  derates linearly at 8 mW/K.  
 For TSSOP20 packages: above 60 °C the value of  $P_{tot}$  derates linearly at 5.5 mW/K.  
 For DHVQFN20 packages: above 60 °C the value of  $P_{tot}$  derates linearly with 4.5 mW/K.

## 8. Recommended operating conditions

**Table 5. Operating conditions**

| Symbol              | Parameter                           | Conditions                              | Min | Typ | Max      | Unit |
|---------------------|-------------------------------------|---|-----|-----|----------|------|
| <b>74AHC573</b>     |                                     |   |     |     |          |      |
| $V_{CC}$            | supply voltage                      |   | 2.0 | 5.0 | 5.5      | V    |
| $V_I$               | input voltage                       |   | 0   | -   | 5.5      | V    |
| $V_O$               | output voltage                      |   | 0   | -   | $V_{CC}$ | V    |
| $T_{amb}$           | ambient temperature                 |   | -40 | +25 | +125     | °C   |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | -   | -   | 100      | ns/V |
|                     |                                     | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | -   | -   | 20       | ns/V |
| <b>74AHCT573</b>    |                                     |   |     |     |          |      |
| $V_{CC}$            | supply voltage                      |   | 4.5 | 5.0 | 5.5      | V    |
| $V_I$               | input voltage                       |   | 0   | -   | 5.5      | V    |
| $V_O$               | output voltage                      |   | 0   | -   | $V_{CC}$ | V    |
| $T_{amb}$           | ambient temperature                 |   | -40 | +25 | +125     | °C   |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | -   | -   | 20       | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics**

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

| Symbol          | Parameter                                     | Conditions                                      | 25 °C |      |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      |      | Unit |
|-----------------|---|---|-------|------|------|------------------|------|-------------------|------|------|------|
|                 |   |   | Min   | Typ  | Max  | Min              | Max  | Min               | Typ  | Max  |      |
| <b>74AHC573</b> |   |   |       |      |      |                  |      |                   |      |      |      |
| $V_{IH}$        | HIGH-level input voltage                      | $V_{CC} = 2.0\text{ V}$                         | 1.5   | -    | -    | 1.5              | -    | 1.5               | -    | -    | V    |
|                 |   | $V_{CC} = 3.0\text{ V}$                         | 2.1   | -    | -    | 2.1              | -    | 2.1               | -    | -    | V    |
|                 |   | $V_{CC} = 5.5\text{ V}$                         | 3.85  | -    | -    | 3.85             | -    | 3.85              | -    | -    | V    |
| $V_{IL}$        | LOW-level input voltage                       | $V_{CC} = 2.0\text{ V}$                         | -     | -    | 0.5  | -                | 0.5  | -                 | -    | 0.5  | V    |
|                 |   | $V_{CC} = 3.0\text{ V}$                         | -     | -    | 0.9  | -                | 0.9  | -                 | -    | 0.9  | V    |
|                 |   | $V_{CC} = 5.5\text{ V}$                         | -     | -    | 1.65 | -                | 1.65 | -                 | -    | 1.65 | V    |
| $V_{OH}$        | HIGH-level output voltage                     | $V_I = V_{IH}$ or $V_{IL}$                      |       |      |      |                  |      |                   |      |      |      |
|                 |   | $I_O = -50\ \mu\text{A}; V_{CC} = 2.0\text{ V}$ | 1.9   | 2.0  | -    | 1.9              | -    | 1.9               | -    | -    | V    |
|                 |   | $I_O = -50\ \mu\text{A}; V_{CC} = 3.0\text{ V}$ | 2.9   | 3.0  | -    | 2.9              | -    | 2.9               | -    | -    | V    |
|                 |   | $I_O = -50\ \mu\text{A}; V_{CC} = 4.5\text{ V}$ | 4.4   | 4.5  | -    | 4.4              | -    | 4.4               | -    | -    | V    |
|                 |   | $I_O = -4.0\text{ mA}; V_{CC} = 3.0\text{ V}$   | 2.58  | -    | -    | 2.48             | -    | 2.40              | -    | -    | V    |
|                 | $I_O = -8.0\text{ mA}; V_{CC} = 4.5\text{ V}$ | 3.94  | -     | -    | 3.80 | -                | 3.70 | -                 | -    | V    |      |
| $V_{OL}$        | LOW-level output voltage                      | $V_I = V_{IH}$ or $V_{IL}$                      |       |      |      |                  |      |                   |      |      |      |
|                 |   | $I_O = 50\ \mu\text{A}; V_{CC} = 2.0\text{ V}$  | -     | 0    | 0.1  | -                | 0.1  | -                 | -    | 0.1  | V    |
|                 |   | $I_O = 50\ \mu\text{A}; V_{CC} = 3.0\text{ V}$  | -     | 0    | 0.1  | -                | 0.1  | -                 | -    | 0.1  | V    |
|                 |   | $I_O = 50\ \mu\text{A}; V_{CC} = 4.5\text{ V}$  | -     | 0    | 0.1  | -                | 0.1  | -                 | -    | 0.1  | V    |
|                 |   | $I_O = 4.0\text{ mA}; V_{CC} = 3.0\text{ V}$    | -     | -    | 0.36 | -                | 0.44 | -                 | -    | 0.55 | V    |
|                 | $I_O = 8.0\text{ mA}; V_{CC} = 4.5\text{ V}$  | -   | -     | 0.36 | -    | 0.44             | -    | -                 | 0.55 | V    |      |

**Table 6. Static characteristics ...continued**

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

| Symbol          | Parameter                | Conditions   | 25 °C |     |       | −40 °C to +85 °C |      | −40 °C to +125 °C |     |       | Unit |
|-----------------|--------------------------|--|-------|-----|-------|------------------|------|-------------------|-----|-------|------|
|                 |                          |  | Min   | Typ | Max   | Min              | Max  | Min               | Typ | Max   |      |
| I <sub>OZ</sub> | OFF-state output current | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>O</sub> = V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 5.5 V | -     | -   | ±0.25 | -                | ±2.5 | -                 | -   | ±10.0 | μA   |
| I <sub>I</sub>  | input leakage current    | V <sub>I</sub> = V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 0 V to 5.5 V   | -     | -   | 0.1   | -                | 1.0  | -                 | -   | 2.0   | μA   |
| I <sub>CC</sub> | supply current           | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 5.5 V                                    | -     | -   | 4.0   | -                | 40   | -                 | -   | 80    | μA   |
| C <sub>I</sub>  | input capacitance        | V <sub>I</sub> = V <sub>CC</sub> or GND  | -     | 3   | 10    | -                | 10   | -                 | -   | 10    | pF   |
| C <sub>O</sub>  | output capacitance       |  | -     | 4   | -     | -                | -    | -                 | -   | 10    | pF   |

### 74AHCT573

|                  |                           |  |      |     |       |      |      |      |   |       |    |
|------------------|---------------------------|--|------|-----|-------|------|------|------|---|-------|----|
| V <sub>IH</sub>  | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V   | 2.0  | -   | -     | 2.0  | -    | 2.0  | - | -     | V  |
| V <sub>IL</sub>  | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V   | -    | -   | 0.8   | -    | 0.8  | -    | - | 0.8   | V  |
| V <sub>OH</sub>  | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V  |      |     |       |      |      |      |   |       |    |
|                  |                           | I <sub>O</sub> = −50 μA  | 4.4  | 4.5 | -     | 4.4  | -    | 4.4  | - | -     | V  |
|                  |                           | I <sub>O</sub> = −8.0 mA   | 3.94 | -   | -     | 3.80 | -    | 3.70 | - | -     | V  |
| V <sub>OL</sub>  | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V  |      |     |       |      |      |      |   |       |    |
|                  |                           | I <sub>O</sub> = 50 μA   | -    | 0   | 0.1   | -    | 0.1  | -    | - | 0.1   | V  |
|                  |                           | I <sub>O</sub> = 8.0 mA  | -    | -   | 0.36  | -    | 0.44 | -    | - | 0.55  | V  |
| I <sub>OZ</sub>  | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>O</sub> = V <sub>CC</sub> or GND per input pin; other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A | -    | -   | ±0.25 | -    | ±2.5 | -    | - | ±10.0 | μA |
| I <sub>I</sub>   | input leakage current     | V <sub>I</sub> = 5.5 V or GND;<br>V <sub>CC</sub> = 0 V to 5.5 V   | -    | -   | 0.1   | -    | 1.0  | -    | - | 2.0   | μA |
| I <sub>CC</sub>  | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 5.5 V  | -    | -   | 4.0   | -    | 40   | -    | - | 80    | μA |
| ΔI <sub>CC</sub> | additional supply current | per input pin;<br>V <sub>I</sub> = V <sub>CC</sub> − 2.1 V; I <sub>O</sub> = 0 A;<br>other pins at V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 4.5 V to 5.5 V               | -    | -   | 1.35  | -    | 1.5  | -    | - | 1.5   | mA |
| C <sub>I</sub>   | input capacitance         | V <sub>I</sub> = V <sub>CC</sub> or GND  | -    | 3   | 10    | -    | 10   | -    | - | 10    | pF |
| C <sub>O</sub>   | output capacitance        |  | -    | 4   | -     | -    | -    | -    | - | 10    | pF |

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#).

| Symbol                 | Parameter   | Conditions  | 25 °C |                    |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |  |
|------------------------|---|---|-------|--------------------|------|------------------|------|-------------------|------|------|--|
|                        |   |   | Min   | Typ <sup>[1]</sup> | Max  | Min              | Max  | Min               | Max  |      |  |
| <b>74AHC573</b>        |   |   |       |                    |      |                  |      |                   |      |      |  |
| t <sub>pd</sub>        | propagation delay                                     | Dn to Qn; see <a href="#">Figure 7</a> <sup>[2]</sup> |       |                    |      |                  |      |                   |      |      |  |
|                        |   | V <sub>CC</sub> = 3.0 V to 3.6 V                      |       |                    |      |                  |      |                   |      |      |  |
|                        |   | C <sub>L</sub> = 15 pF                                | -     | 5.5                | 11.0 | 1.0              | 13.0 | 1.0               | 14.0 | ns   |  |
|                        |   | C <sub>L</sub> = 50 pF                                | -     | 7.8                | 14.5 | 1.0              | 16.5 | 1.0               | 18.5 | ns   |  |
|                        |   | V <sub>CC</sub> = 4.5 V to 5.5 V                      |       |                    |      |                  |      |                   |      |      |  |
|                        |   | C <sub>L</sub> = 15 pF                                | -     | 3.9                | 6.8  | 1.0              | 8.0  | 1.0               | 8.5  | ns   |  |
|                        | C <sub>L</sub> = 50 pF                                | -   | 5.5   | 8.8                | 1.0  | 10.0             | 1.0  | 11.0              | ns   |      |  |
|                        | LE to Qn; see <a href="#">Figure 8</a> <sup>[2]</sup> | V <sub>CC</sub> = 3.0 V to 3.6 V                      |       |                    |      |                  |      |                   |      |      |  |
|                        |   | C <sub>L</sub> = 15 pF                                | -     | 5.8                | 11.9 | 1.0              | 14.0 | 1.0               | 15.0 | ns   |  |
|                        |   | C <sub>L</sub> = 50 pF                                | -     | 8.3                | 15.4 | 1.0              | 17.5 | 1.0               | 19.5 | ns   |  |
|                        |   | V <sub>CC</sub> = 4.5 V to 5.5 V                      |       |                    |      |                  |      |                   |      |      |  |
|                        |   | C <sub>L</sub> = 15 pF                                | -     | 4.2                | 7.7  | 1.0              | 9.0  | 1.0               | 10.0 | ns   |  |
| C <sub>L</sub> = 50 pF |   | -   | 5.9   | 9.7                | 1.0  | 11.0             | 1.0  | 12.5              | ns   |      |  |
| t <sub>en</sub>        | enable time   | OE to Qn; see <a href="#">Figure 9</a> <sup>[3]</sup> |       |                    |      |                  |      |                   |      |      |  |
|                        |   | V <sub>CC</sub> = 3.0 V to 3.6 V                      |       |                    |      |                  |      |                   |      |      |  |
|                        |   | C <sub>L</sub> = 15 pF                                | -     | 5.8                | 11.5 | 1.0              | 13.5 | 1.0               | 14.5 | ns   |  |
|                        |   | C <sub>L</sub> = 50 pF                                | -     | 8.3                | 15.0 | 1.0              | 17.0 | 1.0               | 19.0 | ns   |  |
|                        |   | V <sub>CC</sub> = 4.5 V to 5.5 V                      |       |                    |      |                  |      |                   |      |      |  |
|                        |   | C <sub>L</sub> = 15 pF                                | -     | 4.4                | 7.7  | 1.0              | 9.0  | 1.0               | 10.0 | ns   |  |
| C <sub>L</sub> = 50 pF | -   | 6.3   | 9.7   | 1.0                | 11.0 | 1.0              | 12.5 | ns                |      |      |  |
| t <sub>dis</sub>       | disable time  | OE to Qn; see <a href="#">Figure 9</a> <sup>[4]</sup> |       |                    |      |                  |      |                   |      |      |  |
|                        |   | V <sub>CC</sub> = 3.0 V to 3.6 V                      |       |                    |      |                  |      |                   |      |      |  |
|                        |   | C <sub>L</sub> = 15 pF                                | -     | 6.8                | 11.0 | 1.0              | 13.0 | 1.0               | 14.0 | ns   |  |
|                        |   | C <sub>L</sub> = 50 pF                                | -     | 9.7                | 14.5 | 1.0              | 16.5 | 1.0               | 18.5 | ns   |  |
|                        |   | V <sub>CC</sub> = 4.5 V to 5.5 V                      |       |                    |      |                  |      |                   |      |      |  |
|                        |   | C <sub>L</sub> = 15 pF                                | -     | 4.6                | 7.7  | 1.0              | 9.0  | 1.0               | 10.0 | ns   |  |
| C <sub>L</sub> = 50 pF | -   | 7.4   | 9.7   | 1.0                | 11.0 | 1.0              | 12.5 | ns                |      |      |  |
| t <sub>w</sub>         | pulse width   | LE HIGH; see <a href="#">Figure 8</a>                 |       |                    |      |                  |      |                   |      |      |  |
|                        |   | V <sub>CC</sub> = 3.0 V to 3.6 V                      | 5.0   | -                  | -    | 5.0              | -    | 5.0               | -    | ns   |  |
|                        |   | V <sub>CC</sub> = 4.5 V to 5.5 V                      | 5.0   | -                  | -    | 5.0              | -    | 5.0               | -    | ns   |  |
| t <sub>su</sub>        | set-up time   | Dn to LE; see <a href="#">Figure 10</a>               |       |                    |      |                  |      |                   |      |      |  |
|                        |   | V <sub>CC</sub> = 3.0 V to 3.6 V                      | 3.5   | -                  | -    | 3.5              | -    | 3.5               | -    | ns   |  |
|                        |   | V <sub>CC</sub> = 4.5 V to 5.5 V                      | 3.5   | -                  | -    | 3.5              | -    | 3.5               | -    | ns   |  |



**Table 7. Dynamic characteristics ...continued**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#).

| Symbol  | Parameter                     | Conditions   | 25 °C |                    |     | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|---|-------------------------------|--|-------|--------------------|-----|------------------|------|-------------------|------|------|
|   |                               |  | Min   | Typ <sup>[1]</sup> | Max | Min              | Max  | Min               | Max  |      |
| t <sub>h</sub>                                    | hold time                     | Dn to LE; see <a href="#">Figure 10</a>                            |       |                    |     |                  |      |                   |      |      |
|   |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                   | 1.5   | -                  | -   | 1.5              | -    | 1.5               | -    | ns   |
|   |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                   | 1.5   | -                  | -   | 1.5              | -    | 1.5               | -    | ns   |
| C <sub>PD</sub>                                   | power dissipation capacitance | f <sub>i</sub> = 1 MHz;<br>V <sub>i</sub> = GND to V <sub>CC</sub> | [5]   | -                  | 12  | -                | -    | -                 | -    | pF   |
| <b>74AHCT573; V<sub>CC</sub> = 4.5 V to 5.5 V</b> |                               |  |       |                    |     |                  |      |                   |      |      |
| t <sub>pd</sub>                                   | propagation delay             | Dn to Qn; see <a href="#">Figure 7</a>                             | [2]   |                    |     |                  |      |                   |      |      |
|   |                               | C <sub>L</sub> = 15 pF   | -     | 3.5                | 5.5 | 1                | 6.5  | 1                 | 7.0  | ns   |
|   |                               | C <sub>L</sub> = 50 pF   | -     | 4.9                | 7.5 | 1                | 8.5  | 1                 | 9.5  | ns   |
|   |                               | LE to Qn; see <a href="#">Figure 8</a>                             | [2]   |                    |     |                  |      |                   |      |      |
|   |                               | C <sub>L</sub> = 15 pF   | -     | 3.9                | 6.0 | 1                | 7.0  | 1                 | 7.5  | ns   |
|   |                               | C <sub>L</sub> = 50 pF   | -     | 5.5                | 8.5 | 1                | 9.5  | 1                 | 11.0 | ns   |
| t <sub>en</sub>                                   | enable time                   | OE to Qn; see <a href="#">Figure 9</a>                             | [3]   |                    |     |                  |      |                   |      |      |
|   |                               | C <sub>L</sub> = 15 pF   | -     | 4.1                | 6.5 | 1                | 7.5  | 1                 | 8.5  | ns   |
|   |                               | C <sub>L</sub> = 50 pF   | -     | 5.9                | 8.5 | 1                | 10.0 | 1                 | 11.0 | ns   |
| t <sub>dis</sub>                                  | disable time                  | OE to Qn; see <a href="#">Figure 9</a>                             | [4]   |                    |     |                  |      |                   |      |      |
|   |                               | C <sub>L</sub> = 15 pF   | -     | 4.5                | 6.5 | 1                | 7.5  | 1                 | 8.5  | ns   |
|   |                               | C <sub>L</sub> = 50 pF   | -     | 6.4                | 9.0 | 1                | 10.0 | 1                 | 11.5 | ns   |
| t <sub>W</sub>                                    | pulse width                   | LE HIGH; see <a href="#">Figure 8</a>                              |       | 5.0                | -   | -                | 5.0  | -                 | 5.0  | ns   |
| t <sub>su</sub>                                   | set-up time                   | Dn to LE; see <a href="#">Figure 10</a>                            |       | 3.5                | -   | -                | 3.5  | -                 | 3.5  | ns   |
| t <sub>h</sub>                                    | hold time                     | Dn to LE; see <a href="#">Figure 10</a>                            |       | 1.5                | -   | -                | 1.5  | -                 | 1.5  | ns   |
| C <sub>PD</sub>                                   | power dissipation capacitance | f <sub>i</sub> = 1 MHz;<br>V <sub>i</sub> = GND to V <sub>CC</sub> | [5]   | -                  | 18  | -                | -    | -                 | -    | pF   |

[1] Typical values are measured at nominal supply voltage (V<sub>CC</sub> = 3.3 V and V<sub>CC</sub> = 5.0 V).

[2] t<sub>pd</sub> is the same as t<sub>PHL</sub> and t<sub>PLH</sub>.

[3] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.

[4] t<sub>dis</sub> is the same as t<sub>PHZ</sub> and t<sub>PLZ</sub>.

[5] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f<sub>i</sub> = input frequency in MHz;

f<sub>o</sub> = output frequency in MHz;

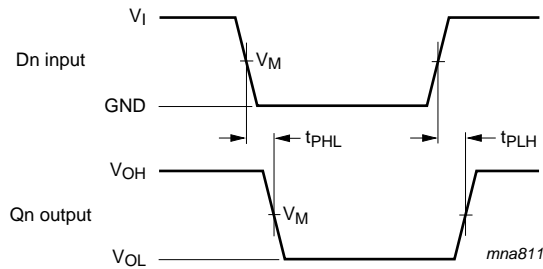
C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

∑(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of the outputs.

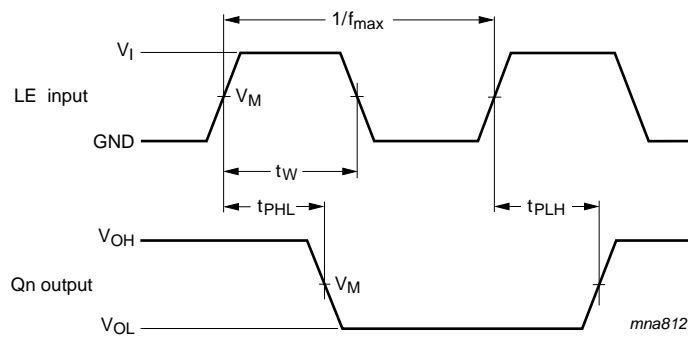
## 11. Waveforms



Measurement points are given in [Table 8](#).

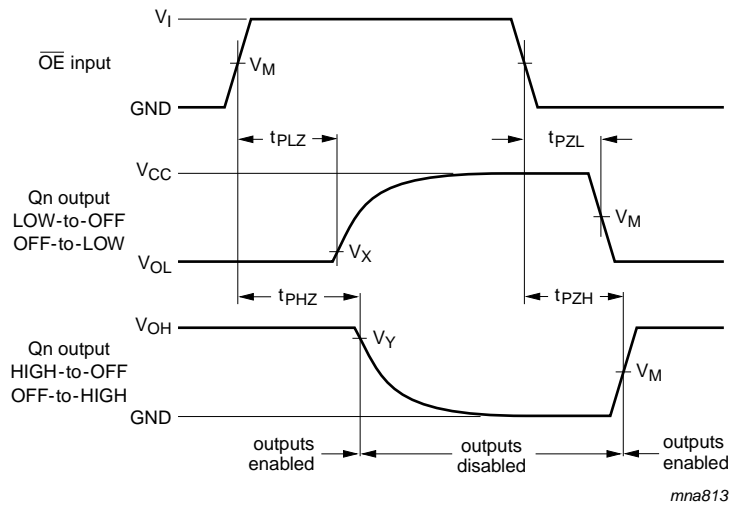
$V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig 7. Data input to output propagation delays**



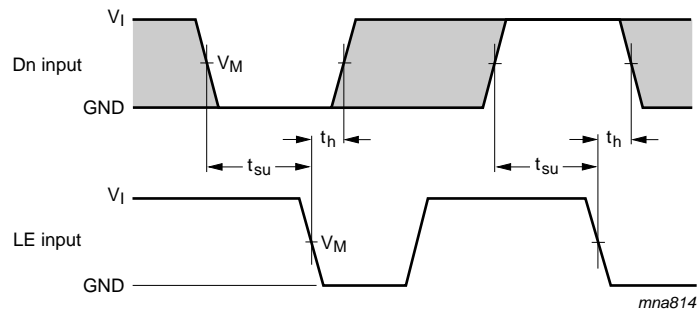
$V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig 8. Latch enable input to output propagation delays**



Measurement points are given in [Table 8](#).  
 $V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig 9. Enable and disable times**

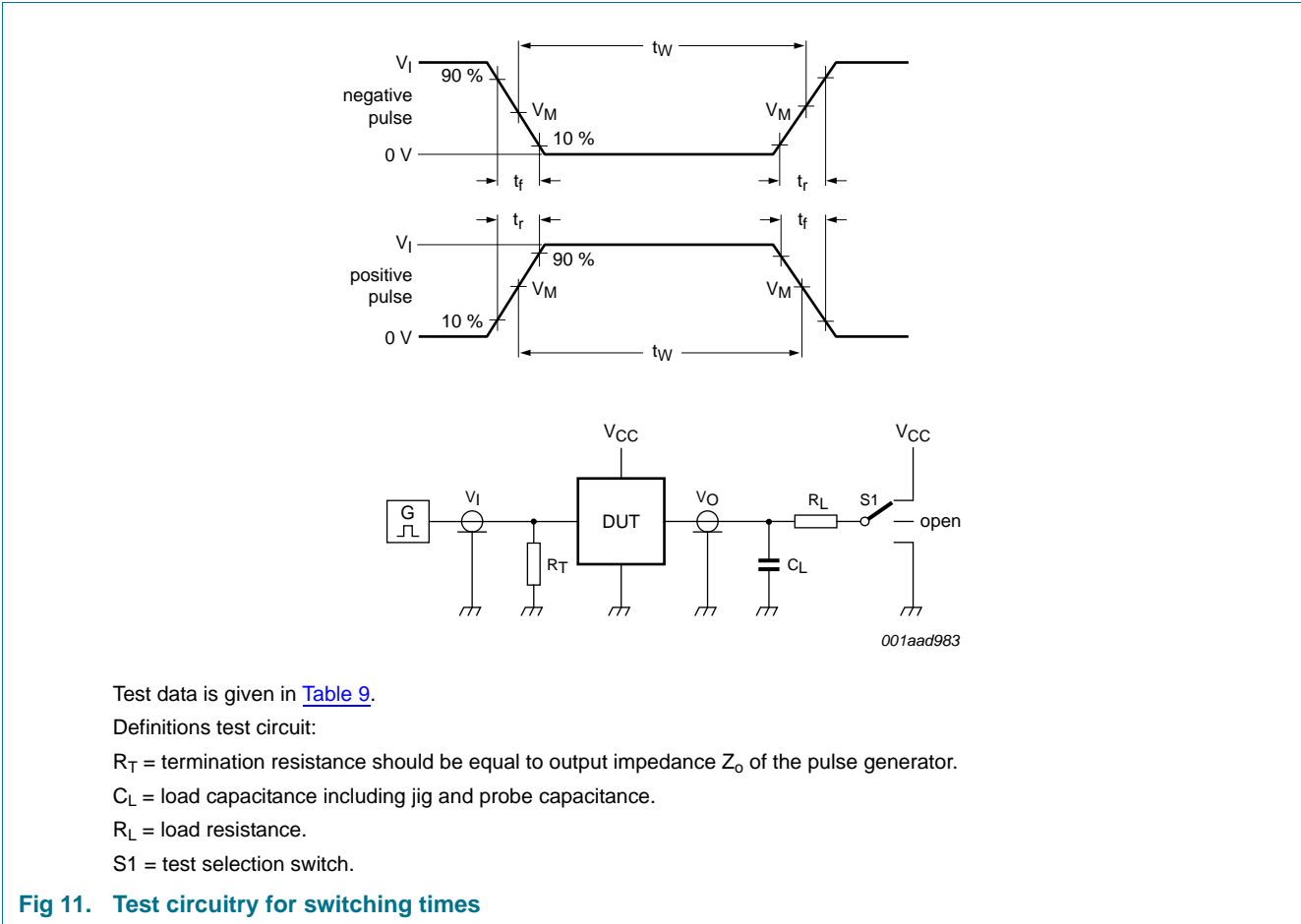


Measurement points are given in [Table 8](#).  
 $V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.  
 The shaded areas indicate when the input is permitted to change for predicable output performance.

**Fig 10. Data set-up and hold times**

**Table 8. Measurement points**

| Type      | Input               | Output              |                          |                          |
|-----------|---------------------|---------------------|--------------------------|--------------------------|
|           | $V_M$               | $V_M$               | $V_X$                    | $V_Y$                    |
| 74AHC573  | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.3 \text{ V}$ | $V_{OH} - 0.3 \text{ V}$ |
| 74AHCT573 | 1.5 V               | $0.5 \times V_{CC}$ | $V_{OL} + 0.3 \text{ V}$ | $V_{OH} - 0.3 \text{ V}$ |



Test data is given in [Table 9](#).

Definitions test circuit:

$R_T$  = termination resistance should be equal to output impedance  $Z_o$  of the pulse generator.

$C_L$  = load capacitance including jig and probe capacitance.

$R_L$  = load resistance.

S1 = test selection switch.

**Fig 11. Test circuitry for switching times**

**Table 9. Test data**

| Type      | Input    |               | Load         |              | S1 position        |                    |                    |
|-----------|----------|---------------|--------------|--------------|--------------------|--------------------|--------------------|
|           | $V_I$    | $t_r, t_f$    | $C_L$        | $R_L$        | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 74AHC573  | $V_{CC}$ | $\leq 3.0$ ns | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |
| 74AHCT573 | 3.0 V    | $\leq 3.0$ ns | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |

12. Package outline

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

SOT163-1

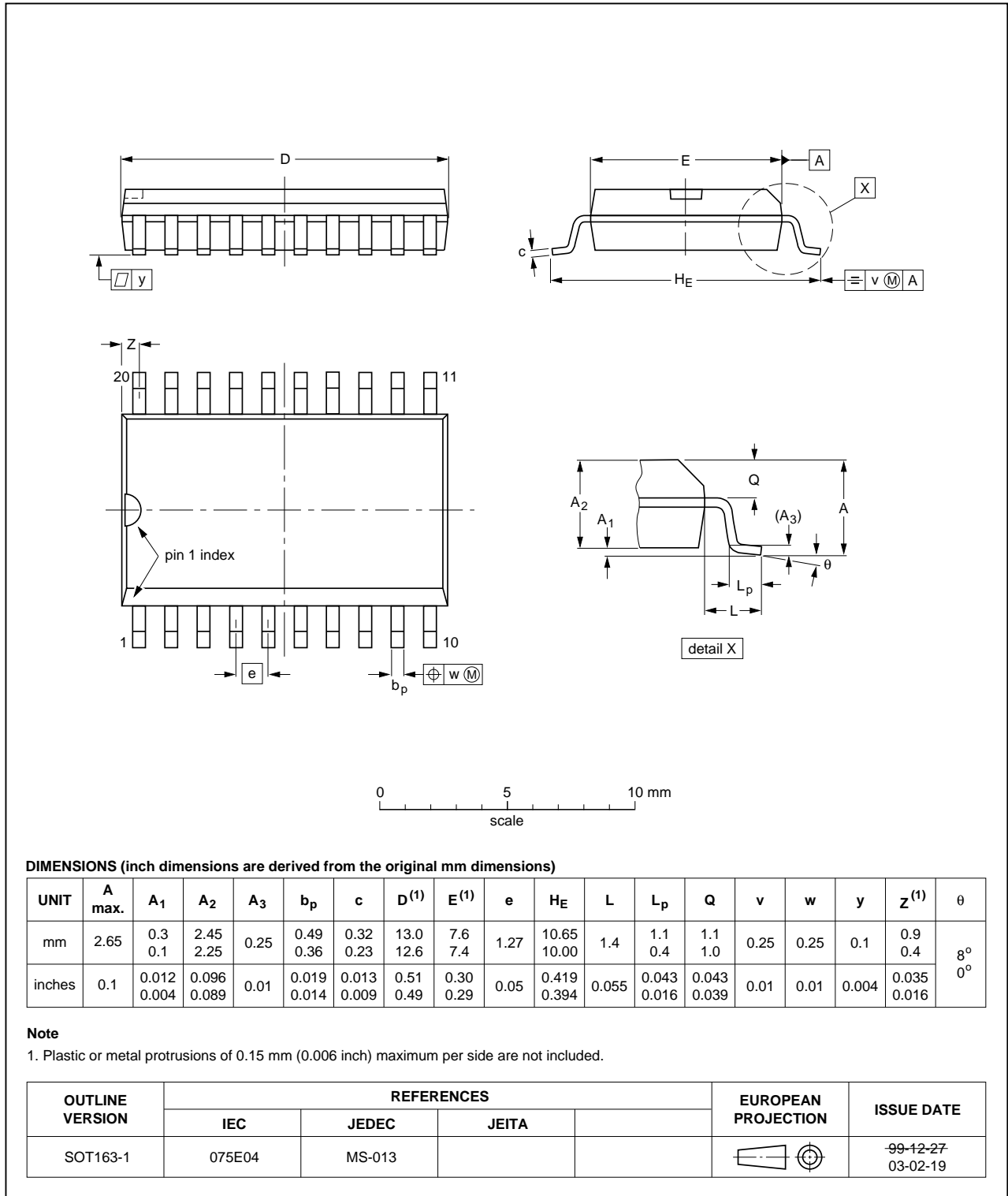


Fig 12. Package outline SOT163-1 (SO20)

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

SOT360-1

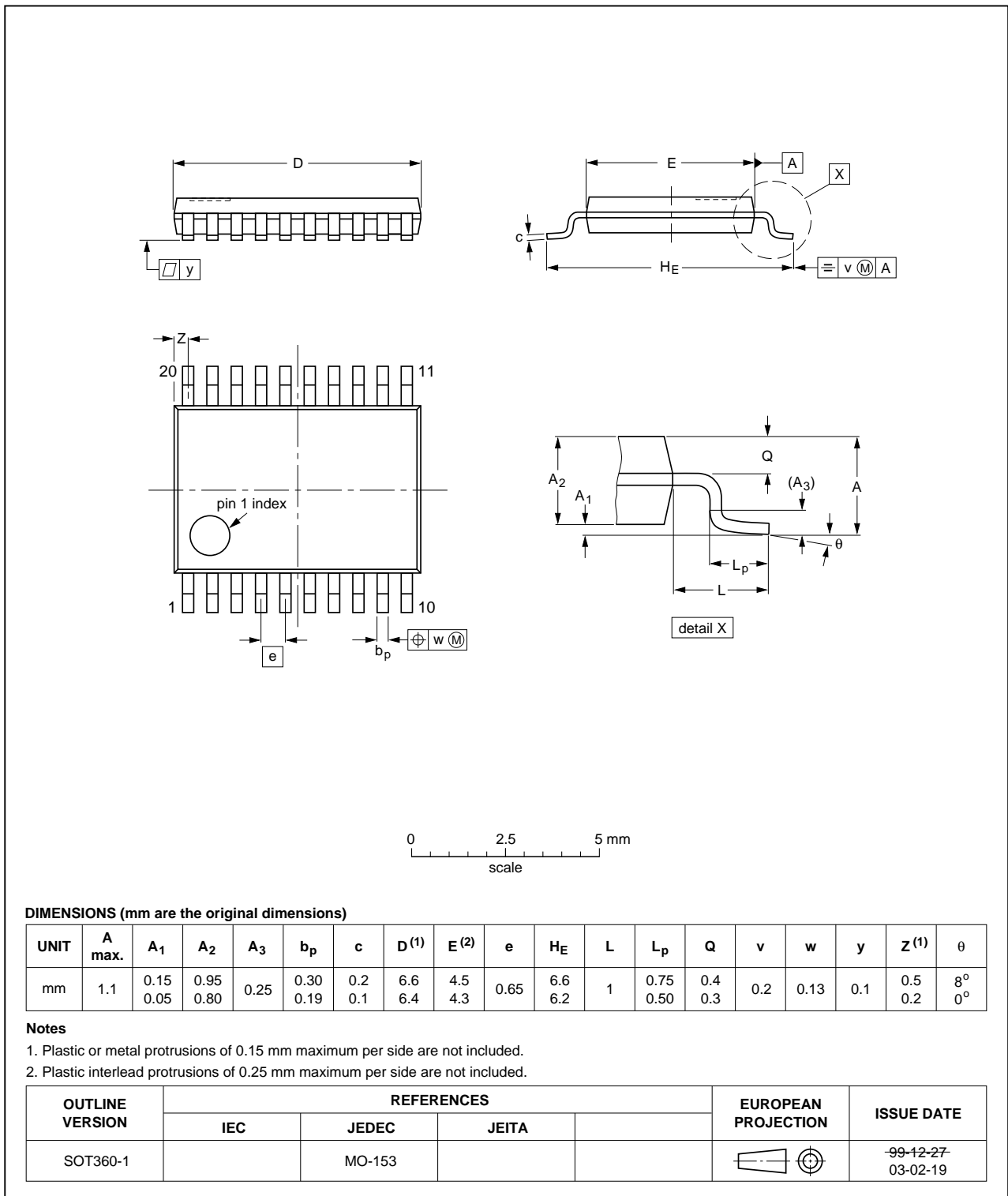


Fig 13. Package outline SOT360-1 (TSSOP20)

**DHVQFN20: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 x 4.5 x 0.85 mm**

**SOT764-1**



**Fig 14. Package outline SOT764-1 (DHVQFN20)**

## 13. Abbreviations

Table 10. Abbreviations

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

## 14. Revision history

Table 11. Revision history

| Document ID       | Release date   | Data sheet status     | Change notice | Supersedes        |
|-------------------|--|-----------------------|---------------|-------------------|
| 74AHC_AHCT573 v.7 | 20111108   | Product data sheet    | -             | 74AHC_AHCT573 v.6 |
| Modifications:    | <ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul> |                       |               |                   |
| 74AHC_AHCT573 v.6 | 20101125   | Product data sheet    | -             | 74AHC_AHCT573 v.5 |
| 74AHC_AHCT573 v.5 | 20100325   | Product data sheet    | -             | 74AHC_AHCT573 v.4 |
| 74AHC_AHCT573 v.4 | 20100303   | Product data sheet    | -             | 74AHC_AHCT573 v.3 |
| 74AHC_AHCT573 v.3 | 20080424   | Product data sheet    | -             | 74AHC_AHCT573 v.2 |
| 74AHC_AHCT573 v.2 | 20031208   | Product specification | -             | 74AHC_AHCT573 v.1 |
| 74AHC_AHCT573 v.1 | 19990927   | Product specification | -             | -                 |



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| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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] data sheet        | Production                    | This document contains the product specification.                                     |

[1] 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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