

# 74HC373; 74HCT373

Octal D-type transparent latch; 3-state

Rev. 5 — 13 December 2011

Product data sheet

## 1. General description

The 74HC373; 74HCT373 is a high-speed Si-gate CMOS device and is pin compatible with Low-power Schottky TTL. It is specified in compliance with JEDEC standard no. 7A.

The 74HC373; 74HCT373 is an octal D-type transparent latch featuring separate D-type inputs for each latch and 3-state outputs for bus oriented applications. A latch enable (LE) input and an output enable ( $\overline{OE}$ ) input are common to all latches.

The 74HC373; 74HCT373 consists of eight D-type transparent latches with 3-state true outputs. When 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 D input changes.

When LE is LOW the latches store the information that was present at the D inputs a set-up time preceding the HIGH-to-LOW transition of LE. When  $\overline{OE}$  is LOW, the contents of the 8 latches are available at the outputs. When  $\overline{OE}$  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 74HC373; 74HCT373 is functionally identical to:

- 74HC563; 74HCT563: but inverted outputs and different pin arrangement
- 74HC573; 74HCT573: but different pin arrangement

## 2. Features and benefits

- 3-state non-inverting outputs for bus oriented applications
- Common 3-state output enable input
- Functionally identical to the 74HC563; 74HCT563 and 74HC573; 74HCT573
- ESD protection:
  - ◆ HBM JESD22-A114F exceeds 2 000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$

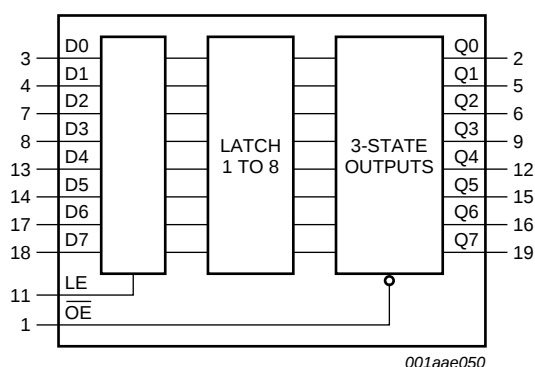


### 3. Ordering information

### Table 1. Ordering information

| Type number | Package           |          |                                                                                                                                |          |
|-------------|-------------------|----------|--------------------------------------------------------------------------------------------------------------------------------|----------|
|             | Temperature range | Name     | Description                                                                                                                    | Version  |
| 74HC373N    | −40 °C to +125 °C | DIP20    | plastic dual in-line package; 20 leads (300 mil)                                                                               | SOT146-1 |
| 74HCT373N   |                   |          |                                                                                                                                |          |
| 74HC373D    | −40 °C to +125 °C | SO20     | plastic small outline package; 20 leads; body width 7.5 mm                                                                     | SOT163-1 |
| 74HCT373D   |                   |          |                                                                                                                                |          |
| 74HC373DB   | −40 °C to +125 °C | SSOP20   | plastic shrink small outline package; 20 leads; body width 5.3 mm                                                              | SOT339-1 |
| 74HCT373DB  |                   |          |                                                                                                                                |          |
| 74HC373PW   | −40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads; body width 4.4 mm                                                         | SOT360-1 |
| 74HCT373PW  |                   |          |                                                                                                                                |          |
| 74HC373BQ   | −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 |
| 74HCT373BQ  |                   |          |                                                                                                                                |          |

#### 4. Functional diagram



**Fig 1. Functional diagram**

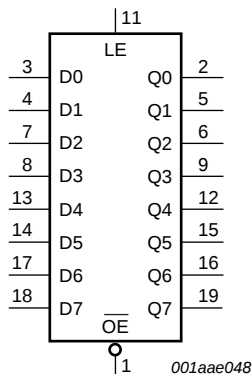


Fig 2. Logic symbol

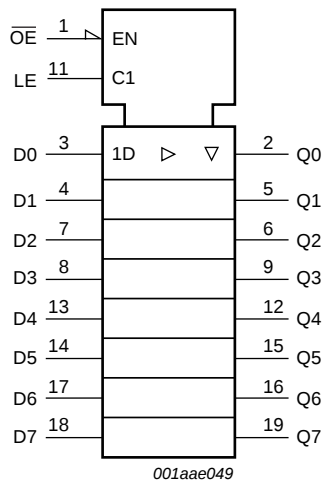


Fig 3. IEC logic symbol

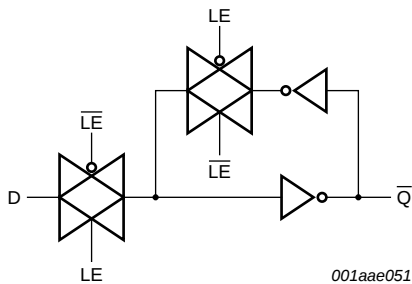


Fig 4. Logic diagram (one latch)

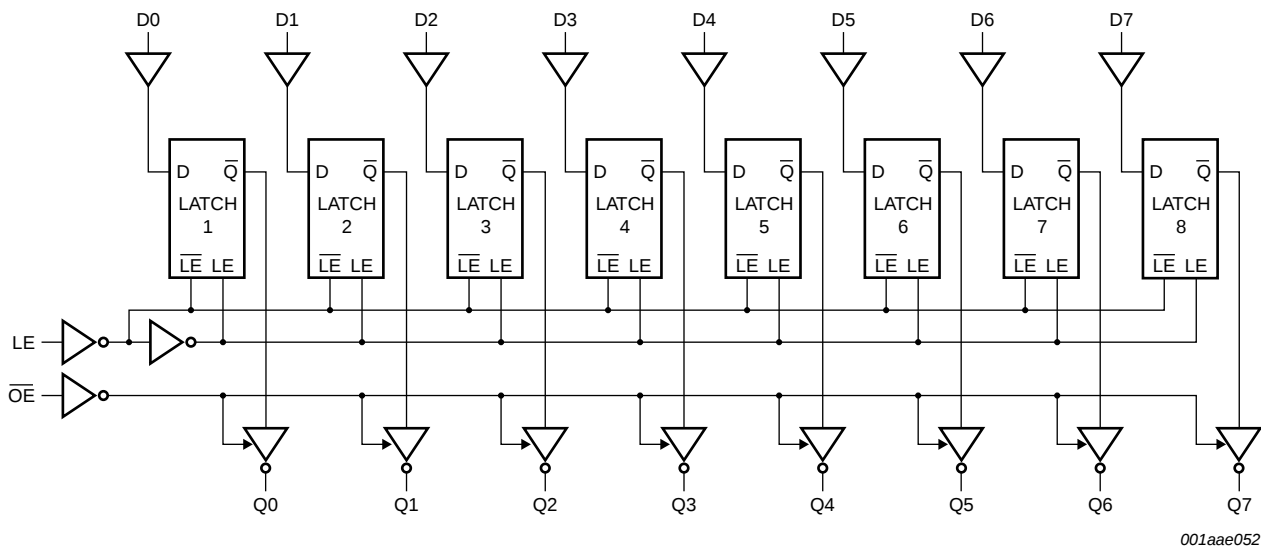


Fig 5. Logic diagram

5. Pinning information

5.1 Pinning

**74HC373  
74HCT373**

terminal 1 index area

**74HC373  
74HCT373**

001aae046

**Fig 6. Pin configuration DIP20, SO20, SSOP20 and TSSOP20**

**74HC373  
74HCT373**

terminal 1 index area

**74HC373  
74HCT373**

001aae047

Transparent top view

(1) The die substrate is attached to this pad using conductive die attach material. It can not be used as supply pin or input.

**Fig 7. Pin configuration DHVQFN20**

5.2 Pin description

Table 2. Pin description

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

## 6. Functional description

### 6.1 Function table

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

| Operating mode                              | Control |    | Input | Internal latches | Output |
|---------------------------------------------|---------|----|-------|------------------|--------|
|                                             | OE      | LE | Dn    |                  | Qn     |
| 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       | X  | X     | X                | 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;  
 X = don't care;  
 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 <sub>CC</sub>  | supply voltage          |                                                                     | −0.5  | +7   | V    |
| I <sub>IK</sub>  | input clamping current  | V <sub>I</sub> < −0.5 V or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V | -     | ±20  | mA   |
| I <sub>OK</sub>  | output clamping current | V <sub>O</sub> < −0.5 V or V <sub>O</sub> > V <sub>CC</sub> + 0.5 V | -     | ±20  | mA   |
| I <sub>O</sub>   | output current          | V <sub>O</sub> = −0.5 V to (V <sub>CC</sub> + 0.5 V)                | -     | ±35  | mA   |
| I <sub>CC</sub>  | supply current          |                                                                     | -     | +70  | mA   |
| I <sub>GND</sub> | ground current          |                                                                     | -     | −70  | mA   |
| T <sub>stg</sub> | storage temperature     |                                                                     | −65   | +150 | °C   |
| P <sub>tot</sub> | total power dissipation | DIP20 package                                                       | [1] - | 750  | mW   |
|                  |                         | SO20 package                                                        | [2] - | 500  | mW   |
|                  |                         | SSOP20 package                                                      | [3]   | 500  | mW   |
|                  |                         | TSSOP20 package                                                     | [3]   | 500  | mW   |
|                  |                         | DHVQFN20 package                                                    | [4] - | 500  | mW   |

- [1] For DIP20 package: P<sub>tot</sub> derates linearly with 12 mW/K above 70 °C.  
 [2] For SO20: P<sub>tot</sub> derates linearly with 8 mW/K above 70 °C.  
 [3] For SSOP20 and TSSOP20 packages: P<sub>tot</sub> derates linearly with 5.5 mW/K above 60 °C.  
 [4] For DHVQFN20 package: P<sub>tot</sub> derates linearly with 4.5 mW/K above 60 °C.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

Voltages are referenced to GND (ground = 0 V)

| Symbol           | Parameter                           | Conditions              | 74HC373 |      |                 | 74HCT373 |      |                 | Unit |
|------------------|-------------------------------------|-------------------------|---------|------|-----------------|----------|------|-----------------|------|
|                  |                                     |                         | Min     | Typ  | Max             | Min      | Typ  | Max             |      |
| V <sub>CC</sub>  | supply voltage                      |                         | 2.0     | 5.0  | 6.0             | 4.5      | 5.0  | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                         | 0       | -    | V <sub>CC</sub> | 0        | -    | V <sub>CC</sub> | V    |
| V <sub>O</sub>   | output voltage                      |                         | 0       | -    | V <sub>CC</sub> | 0        | -    | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                         | -40     | +25  | +125            | -40      | +25  | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 2.0 V | -       | -    | 625             | -        | -    | -               | ns/V |
|                  |                                     | V <sub>CC</sub> = 4.5 V | -       | 1.67 | 139             | -        | 1.67 | 139             | ns/V |
|                  |                                     | V <sub>CC</sub> = 6.0 V | -       | -    | 83              | -        | -    | -               | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics 74HC373**

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

| Symbol                   | Parameter                 | Conditions                                                                                                                | Min  | Typ  | Max  | Unit |
|--------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| T <sub>amb</sub> = 25 °C |                           |                                                                                                                           |      |      |      |      |
| V <sub>IH</sub>          | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V                                                                                                   | 1.5  | 1.2  | -    | V    |
|                          |                           | V <sub>CC</sub> = 4.5 V                                                                                                   | 3.15 | 2.4  | -    | V    |
|                          |                           | V <sub>CC</sub> = 6.0 V                                                                                                   | 4.2  | 3.2  | -    | V    |
| V <sub>IL</sub>          | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V                                                                                                   | -    | 0.8  | 0.5  | V    |
|                          |                           | V <sub>CC</sub> = 4.5 V                                                                                                   | -    | 2.1  | 1.35 | V    |
|                          |                           | V <sub>CC</sub> = 6.0 V                                                                                                   | -    | 2.8  | 1.8  | V    |
| V <sub>OH</sub>          | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                       | -    | -    | -    |      |
|                          |                           | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 2.0 V                                                                          | 1.9  | 2.0  | -    | V    |
|                          |                           | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 4.5 V                                                                          | 4.4  | 4.5  | -    | V    |
|                          |                           | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 6.0 V                                                                          | 5.9  | 6.0  | -    | V    |
|                          |                           | I <sub>O</sub> = -6.0 mA; V <sub>CC</sub> = 4.5 V                                                                         | 3.98 | 4.32 | -    | V    |
|                          |                           | I <sub>O</sub> = -7.8 mA; V <sub>CC</sub> = 6.0 V                                                                         | 5.48 | 5.81 | -    | V    |
| V <sub>OL</sub>          | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                       |      |      |      |      |
|                          |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 2.0 V                                                                           | -    | 0    | 0.1  | V    |
|                          |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V                                                                           | -    | 0    | 0.1  | V    |
|                          |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 V                                                                           | -    | 0    | 0.1  | V    |
|                          |                           | I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V                                                                          | -    | 0.15 | 0.26 | V    |
|                          |                           | I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V                                                                          | -    | 0.16 | 0.26 | V    |
| I <sub>I</sub>           | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V                                                          | -    | -    | ±0.1 | μA   |
| I <sub>OZ</sub>          | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 6.0 V;<br>V <sub>O</sub> = V <sub>CC</sub> or GND | -    | -    | ±0.5 | μA   |
| I <sub>CC</sub>          | supply current            | V <sub>CC</sub> = 6.0 V; I <sub>O</sub> = 0 A;<br>V <sub>I</sub> = V <sub>CC</sub> or GND                                 | -    | -    | 8.0  | μA   |
| C <sub>I</sub>           | input capacitance         |                                                                                                                           | -    | 3.5  | -    | pF   |

**Table 6.** Static characteristics 74HC373 ...continued

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

| Symbol                                     | Parameter                 | Conditions                                                                                                                | Min  | Typ | Max  | Unit |
|--------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|------|-----|------|------|
| <b>T<sub>amb</sub> = -40 °C to +85 °C</b>  |                           |                                                                                                                           |      |     |      |      |
| V <sub>IH</sub>                            | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V                                                                                                   | 1.5  | -   | -    | V    |
|                                            |                           | V <sub>CC</sub> = 4.5 V                                                                                                   | 3.15 | -   | -    | V    |
|                                            |                           | V <sub>CC</sub> = 6.0 V                                                                                                   | 4.2  | -   | -    | V    |
| V <sub>IL</sub>                            | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V                                                                                                   | -    | -   | 0.5  | V    |
|                                            |                           | V <sub>CC</sub> = 4.5 V                                                                                                   | -    | -   | 1.35 | V    |
|                                            |                           | V <sub>CC</sub> = 6.0 V                                                                                                   | -    | -   | 1.8  | V    |
| V <sub>OH</sub>                            | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                       |      |     |      |      |
|                                            |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 2.0 V                                                                          | 1.9  | -   | -    | V    |
|                                            |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 4.5 V                                                                          | 4.4  | -   | -    | V    |
|                                            |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 6.0 V                                                                          | 5.9  | -   | -    | V    |
|                                            |                           | I <sub>O</sub> = -6.0 mA; V <sub>CC</sub> = 4.5 V                                                                         | 3.84 | -   | -    | V    |
|                                            |                           | I <sub>O</sub> = -7.8 mA; V <sub>CC</sub> = 6.0 V                                                                         | 5.34 | -   | -    | V    |
| V <sub>OL</sub>                            | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                       |      |     |      |      |
|                                            |                           | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 2.0 V                                                                           | -    | -   | 0.1  | V    |
|                                            |                           | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 4.5 V                                                                           | -    | -   | 0.1  | V    |
|                                            |                           | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 6.0 V                                                                           | -    | -   | 0.1  | V    |
|                                            |                           | I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V                                                                          | -    | -   | 0.33 | V    |
|                                            |                           | I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V                                                                          | -    | -   | 0.33 | V    |
| I <sub>I</sub>                             | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V                                                          | -    | -   | ±1.0 | µA   |
| I <sub>OZ</sub>                            | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 6.0 V;<br>V <sub>O</sub> = V <sub>CC</sub> or GND | -    | -   | ±5.0 | µA   |
| I <sub>CC</sub>                            | supply current            | V <sub>CC</sub> = 6.0 V; I <sub>O</sub> = 0 A;<br>V <sub>I</sub> = V <sub>CC</sub> or GND                                 |      | -   | 80   | µA   |
| <b>T<sub>amb</sub> = -40 °C to +125 °C</b> |                           |                                                                                                                           |      |     |      |      |
| V <sub>IH</sub>                            | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V                                                                                                   | 1.5  | -   | -    | V    |
|                                            |                           | V <sub>CC</sub> = 4.5 V                                                                                                   | 3.15 | -   | -    | V    |
|                                            |                           | V <sub>CC</sub> = 6.0 V                                                                                                   | 4.2  | -   | -    | V    |
| V <sub>IL</sub>                            | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V                                                                                                   | -    | -   | 0.5  | V    |
|                                            |                           | V <sub>CC</sub> = 4.5 V                                                                                                   | -    | -   | 1.35 | V    |
|                                            |                           | V <sub>CC</sub> = 6.0 V                                                                                                   | -    | -   | 1.8  | V    |
| V <sub>OH</sub>                            | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                       |      |     |      |      |
|                                            |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 2.0 V                                                                          | 1.9  | -   | -    | V    |
|                                            |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 4.5 V                                                                          | 4.4  | -   | -    | V    |
|                                            |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 6.0 V                                                                          | 5.9  | -   | -    | V    |
|                                            |                           | I <sub>O</sub> = -6.0 mA; V <sub>CC</sub> = 4.5 V                                                                         | 3.7  | -   | -    | V    |
|                                            |                           | I <sub>O</sub> = -7.8 mA; V <sub>CC</sub> = 6.0 V                                                                         | 5.2  | -   | -    | V    |

**Table 6.** Static characteristics 74HC373 ...continued

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

| Symbol          | Parameter                | Conditions                                                                                                                | Min | Typ | Max   | Unit |
|-----------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|------|
| V <sub>OL</sub> | LOW-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                       |     |     |       |      |
|                 |                          | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 2.0 V                                                                           | -   | -   | 0.1   | V    |
|                 |                          | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 4.5 V                                                                           | -   | -   | 0.1   | V    |
|                 |                          | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 6.0 V                                                                           | -   | -   | 0.1   | V    |
|                 |                          | I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V                                                                          | -   | -   | 0.4   | V    |
|                 |                          | I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V                                                                          | -   | -   | 0.4   | V    |
| I <sub>I</sub>  | input leakage current    | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V                                                          | -   | -   | ±1.0  | µA   |
| I <sub>OZ</sub> | OFF-state output current | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 6.0 V;<br>V <sub>O</sub> = V <sub>CC</sub> or GND | -   | -   | ±10.0 | µA   |
| I <sub>CC</sub> | supply current           | V <sub>CC</sub> = 6.0 V; I <sub>O</sub> = 0 A;<br>V <sub>I</sub> = V <sub>CC</sub> or GND                                 | -   | -   | 160   | µA   |

**Table 7.** Static characteristics 74HCT373

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

| Symbol                                    | Parameter                 | Conditions                                                                                                                                                                                               | Min  | Typ  | Max  | Unit |
|-------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| <b>T<sub>amb</sub> = 25 °C</b>            |                           |                                                                                                                                                                                                          |      |      |      |      |
| V <sub>IH</sub>                           | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | 2.0  | 1.6  | -    | V    |
| V <sub>IL</sub>                           | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | -    | 1.2  | 0.8  | V    |
| V <sub>OH</sub>                           | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                                                                                                      |      |      |      |      |
|                                           |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 4.5 V                                                                                                                                                         | 4.4  | 4.5  | -    | V    |
|                                           |                           | I <sub>O</sub> = -6.0 mA; V <sub>CC</sub> = 4.5 V                                                                                                                                                        | 3.98 | 4.32 | -    | V    |
| V <sub>OL</sub>                           | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                                                                                                      |      |      |      |      |
|                                           |                           | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 4.5 V                                                                                                                                                          | -    | 0.0  | 0.1  | V    |
|                                           |                           | I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V                                                                                                                                                         | -    | 0.16 | 0.26 | V    |
| I <sub>I</sub>                            | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V                                                                                                                                         | -    | -    | ±0.1 | µA   |
| I <sub>OZ</sub>                           | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V;<br>V <sub>O</sub> = V <sub>CC</sub> or GND per input pin;<br>other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A | -    | -    | ±0.5 | 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                                                                                                                | -    | -    | 8.0  | µA   |
| ΔI <sub>CC</sub>                          | additional supply current | V <sub>I</sub> = V <sub>CC</sub> - 2.1 V;<br>other inputs at V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A                                                           |      |      |      |      |
|                                           |                           | Dn                                                                                                                                                                                                       | -    | 30   | 108  | µA   |
|                                           |                           | LE                                                                                                                                                                                                       | -    | 150  | 540  | µA   |
|                                           |                           | $\overline{\text{OE}}$                                                                                                                                                                                   | -    | 100  | 360  | µA   |
| C <sub>I</sub>                            | input capacitance         |                                                                                                                                                                                                          | -    | 3.5  | -    | pF   |
| <b>T<sub>amb</sub> = -40 °C to +85 °C</b> |                           |                                                                                                                                                                                                          |      |      |      |      |
| V <sub>IH</sub>                           | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | 2.0  | -    | -    | V    |
| V <sub>IL</sub>                           | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | -    | -    | 0.8  | V    |

**Table 7.** Static characteristics 74HCT373 ...continued

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

| Symbol                               | Parameter                 | Conditions                                                                                                                                                                                               | Min  | Typ | Max  | Unit |
|--------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|------|------|
| V <sub>OH</sub>                      | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                                                                                                      |      |     |      |      |
|                                      |                           | I <sub>O</sub> = −20 μA; V <sub>CC</sub> = 4.5 V                                                                                                                                                         | 4.4  | -   | -    | V    |
|                                      |                           | I <sub>O</sub> = −6.0 μA; V <sub>CC</sub> = 4.5 V                                                                                                                                                        | 3.84 | -   | -    | V    |
| V <sub>OL</sub>                      | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                                                                                                      |      |     |      |      |
|                                      |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V                                                                                                                                                          | -    | -   | 0.1  | V    |
|                                      |                           | I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V                                                                                                                                                         | -    | -   | 0.33 | V    |
| I <sub>I</sub>                       | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V                                                                                                                                         | -    | -   | ±1.0 | μA   |
| I <sub>OZ</sub>                      | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V;<br>V <sub>O</sub> = V <sub>CC</sub> or GND per input pin;<br>other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A | -    | -   | ±5.0 | 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                                                                                                                | -    | -   | 80   | μA   |
| ΔI <sub>CC</sub>                     | additional supply current | V <sub>I</sub> = V <sub>CC</sub> − 2.1 V;<br>other inputs at V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A                                                           |      |     |      |      |
|                                      |                           | Dn                                                                                                                                                                                                       | -    | -   | 135  | μA   |
|                                      |                           | LE                                                                                                                                                                                                       | -    | -   | 675  | μA   |
|                                      |                           | OE                                                                                                                                                                                                       | -    | -   | 450  | μA   |
| T <sub>amb</sub> = −40 °C to +125 °C |                           |                                                                                                                                                                                                          |      |     |      |      |
| V <sub>IH</sub>                      | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | 2.0  | -   | -    | V    |
| V <sub>IL</sub>                      | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | -    | -   | 0.8  | V    |
| V <sub>OH</sub>                      | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                                                                                                      |      |     |      |      |
|                                      |                           | I <sub>O</sub> = −20 μA; V <sub>CC</sub> = 4.5 V                                                                                                                                                         | 4.4  | -   | -    | V    |
|                                      |                           | I <sub>O</sub> = −6.0 mA; V <sub>CC</sub> = 4.5 V                                                                                                                                                        | 3.7  | -   | -    | V    |
| V <sub>OL</sub>                      | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                                                                                                      |      |     |      |      |
|                                      |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V                                                                                                                                                          | -    | -   | 0.1  | V    |
|                                      |                           | I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V                                                                                                                                                         | -    | -   | 0.4  | V    |
| I <sub>I</sub>                       | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V                                                                                                                                         | -    | -   | ±1.0 | μA   |
| I <sub>OZ</sub>                      | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V;<br>V <sub>O</sub> = V <sub>CC</sub> or GND per input pin;<br>other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A | -    | -   | ±10  | 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                                                                                                                | -    | -   | 160  | μA   |
| ΔI <sub>CC</sub>                     | additional supply current | V <sub>I</sub> = V <sub>CC</sub> − 2.1 V;<br>other inputs at V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A                                                           |      |     |      |      |
|                                      |                           | Dn                                                                                                                                                                                                       | -    | -   | 147  | μA   |
|                                      |                           | LE                                                                                                                                                                                                       | -    | -   | 735  | μA   |
|                                      |                           | OE                                                                                                                                                                                                       | -    | -   | 490  | μA   |

## 10. Dynamic characteristics

**Table 8. Dynamic characteristics 74HC373**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

| Symbol                         | Parameter                     | Conditions                                                    | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|---------------------------------------------------------------|-----|-----|-----|------|
| <b>T<sub>amb</sub> = 25 °C</b> |                               |                                                               |     |     |     |      |
| t <sub>pd</sub>                | propagation delay             | Dn to Qn; see <a href="#">Figure 8</a>                        | [1] |     |     |      |
|                                |                               | V <sub>CC</sub> = 2.0 V                                       | -   | 41  | 150 | ns   |
|                                |                               | V <sub>CC</sub> = 4.5 V                                       | -   | 15  | 30  | ns   |
|                                |                               | V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF                 | -   | 12  | -   | ns   |
|                                |                               | V <sub>CC</sub> = 6.0 V                                       | -   | 12  | 26  | ns   |
|                                |                               | LE to Qn; see <a href="#">Figure 9</a>                        |     |     |     |      |
|                                |                               | V <sub>CC</sub> = 2.0 V                                       | -   | 50  | 175 | ns   |
|                                |                               | V <sub>CC</sub> = 4.5 V                                       | -   | 18  | 35  | ns   |
|                                |                               | V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF                 | -   | 15  | -   | ns   |
|                                |                               | V <sub>CC</sub> = 6.0 V                                       | -   | 14  | 30  | ns   |
| t <sub>en</sub>                | enable time                   | OE to Qn; see <a href="#">Figure 10</a>                       | [2] |     |     |      |
|                                |                               | V <sub>CC</sub> = 2.0 V                                       | -   | 44  | 150 | ns   |
|                                |                               | V <sub>CC</sub> = 4.5 V                                       | -   | 16  | 30  | ns   |
|                                |                               | V <sub>CC</sub> = 6.0 V                                       | -   | 13  | 26  | ns   |
| t <sub>dis</sub>               | disable time                  | OE to Qn; see <a href="#">Figure 10</a>                       | [3] |     |     |      |
|                                |                               | V <sub>CC</sub> = 2.0 V                                       | -   | 47  | 150 | ns   |
|                                |                               | V <sub>CC</sub> = 4.5 V                                       | -   | 17  | 30  | ns   |
|                                |                               | V <sub>CC</sub> = 6.0 V                                       | -   | 14  | 26  | ns   |
| t <sub>t</sub>                 | transition time               | Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> | [4] |     |     |      |
|                                |                               | V <sub>CC</sub> = 2.0 V                                       | -   | 14  | 60  | ns   |
|                                |                               | V <sub>CC</sub> = 4.5 V                                       | -   | 5   | 12  | ns   |
|                                |                               | V <sub>CC</sub> = 6.0 V                                       | -   | 4   | 10  | ns   |
| t <sub>w</sub>                 | pulse width                   | LE HIGH; see <a href="#">Figure 9</a>                         |     |     |     |      |
|                                |                               | V <sub>CC</sub> = 2.0 V                                       | 80  | 17  | -   | ns   |
|                                |                               | V <sub>CC</sub> = 4.5 V                                       | 16  | 6   | -   | ns   |
|                                |                               | V <sub>CC</sub> = 6.0 V                                       | 14  | 5   | -   | ns   |
| t <sub>su</sub>                | set-up time                   | Dn to LE; see <a href="#">Figure 11</a>                       |     |     |     |      |
|                                |                               | V <sub>CC</sub> = 2.0 V                                       | 50  | 14  | -   | ns   |
|                                |                               | V <sub>CC</sub> = 4.5 V                                       | 10  | 5   | -   | ns   |
|                                |                               | V <sub>CC</sub> = 6.0 V                                       | 9   | 4   | -   | ns   |
| t <sub>h</sub>                 | hold time                     | Dn to LE; see <a href="#">Figure 11</a>                       |     |     |     |      |
|                                |                               | V <sub>CC</sub> = 2.0 V                                       | +5  | -8  | -   | ns   |
|                                |                               | V <sub>CC</sub> = 4.5 V                                       | +5  | -3  | -   | ns   |
|                                |                               | V <sub>CC</sub> = 6.0 V                                       | +5  | -2  | -   | ns   |
| C <sub>PD</sub>                | power dissipation capacitance | per latch; V <sub>I</sub> = GND to V <sub>CC</sub>            | [5] | -   | 45  | pF   |

**Table 8.** Dynamic characteristics 74HC373 ...continued

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

| Symbol                                                                  | Parameter         | Conditions                                                    | Min                 | Typ | Max | Unit |
|-------------------------------------------------------------------------|-------------------|---------------------------------------------------------------|---------------------|-----|-----|------|
| $T_{amb} = -40\text{ }^{\circ}\text{C to } +85\text{ }^{\circ}\text{C}$ |                   |                                                               |                     |     |     |      |
| $t_{pd}$                                                                | propagation delay | Dn to Qn; see <a href="#">Figure 8</a>                        | <a href="#">[1]</a> |     |     |      |
|                                                                         |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 190 | ns   |
|                                                                         |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 38  | ns   |
|                                                                         |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 33  | ns   |
|                                                                         |                   | LE to Qn; see <a href="#">Figure 9</a>                        |                     |     |     |      |
|                                                                         |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 220 | ns   |
|                                                                         |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 44  | ns   |
|                                                                         |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 37  | ns   |
| $t_{en}$                                                                | enable time       | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | <a href="#">[2]</a> |     |     |      |
|                                                                         |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 190 | ns   |
|                                                                         |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 38  | ns   |
|                                                                         |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 33  | ns   |
| $t_{dis}$                                                               | disable time      | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | <a href="#">[3]</a> |     |     |      |
|                                                                         |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 190 | ns   |
|                                                                         |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 38  | ns   |
|                                                                         |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 33  | ns   |
| $t_t$                                                                   | transition time   | Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> | <a href="#">[4]</a> |     |     |      |
|                                                                         |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 75  | ns   |
|                                                                         |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 15  | ns   |
|                                                                         |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 13  | ns   |
| $t_W$                                                                   | pulse width       | LE HIGH; see <a href="#">Figure 9</a>                         |                     |     |     |      |
|                                                                         |                   | $V_{CC} = 2.0\text{ V}$                                       | 100                 | -   | -   | ns   |
|                                                                         |                   | $V_{CC} = 4.5\text{ V}$                                       | 20                  | -   | -   | ns   |
|                                                                         |                   | $V_{CC} = 6.0\text{ V}$                                       | 17                  | -   | -   | ns   |
| $t_{su}$                                                                | set-up time       | Dn to LE; see <a href="#">Figure 11</a>                       |                     |     |     |      |
|                                                                         |                   | $V_{CC} = 2.0\text{ V}$                                       | 65                  | -   | -   | ns   |
|                                                                         |                   | $V_{CC} = 4.5\text{ V}$                                       | 13                  | -   | -   | ns   |
|                                                                         |                   | $V_{CC} = 6.0\text{ V}$                                       | 11                  | -   | -   | ns   |
| $t_h$                                                                   | hold time         | Dn to LE; see <a href="#">Figure 11</a>                       |                     |     |     |      |
|                                                                         |                   | $V_{CC} = 2.0\text{ V}$                                       | 5                   | -   | -   | ns   |
|                                                                         |                   | $V_{CC} = 4.5\text{ V}$                                       | 5                   | -   | -   | ns   |
|                                                                         |                   | $V_{CC} = 6.0\text{ V}$                                       | 5                   | -   | -   | ns   |

**Table 8.** Dynamic characteristics 74HC373 ...continued

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

| Symbol                                                                   | Parameter         | Conditions                                                    | Min                 | Typ | Max | Unit |
|--------------------------------------------------------------------------|-------------------|---------------------------------------------------------------|---------------------|-----|-----|------|
| $T_{amb} = -40\text{ }^{\circ}\text{C to } +125\text{ }^{\circ}\text{C}$ |                   |                                                               |                     |     |     |      |
| $t_{pd}$                                                                 | propagation delay | Dn to Qn; see <a href="#">Figure 8</a>                        | <a href="#">[1]</a> |     |     |      |
|                                                                          |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 225 | ns   |
|                                                                          |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 45  | ns   |
|                                                                          |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 38  | ns   |
|                                                                          |                   | LE to Qn; see <a href="#">Figure 9</a>                        |                     |     |     |      |
|                                                                          |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 265 | ns   |
|                                                                          |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 53  | ns   |
|                                                                          |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 45  | ns   |
| $t_{en}$                                                                 | enable time       | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | <a href="#">[2]</a> |     |     |      |
|                                                                          |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 225 | ns   |
|                                                                          |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 45  | ns   |
|                                                                          |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 38  | ns   |
| $t_{dis}$                                                                | disable time      | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | <a href="#">[3]</a> |     |     |      |
|                                                                          |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 225 | ns   |
|                                                                          |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 45  | ns   |
|                                                                          |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 38  | ns   |
| $t_t$                                                                    | transition time   | Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> | <a href="#">[4]</a> |     |     |      |
|                                                                          |                   | $V_{CC} = 2.0\text{ V}$                                       | -                   | -   | 90  | ns   |
|                                                                          |                   | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 18  | ns   |
|                                                                          |                   | $V_{CC} = 6.0\text{ V}$                                       | -                   | -   | 15  | ns   |
| $t_w$                                                                    | pulse width       | LE HIGH; see <a href="#">Figure 9</a>                         |                     |     |     |      |
|                                                                          |                   | $V_{CC} = 2.0\text{ V}$                                       | 120                 | -   | -   | ns   |
|                                                                          |                   | $V_{CC} = 4.5\text{ V}$                                       | 24                  | -   | -   | ns   |
|                                                                          |                   | $V_{CC} = 6.0\text{ V}$                                       | 20                  | -   | -   | ns   |
| $t_{su}$                                                                 | set-up time       | Dn to LE; see <a href="#">Figure 11</a>                       |                     |     |     |      |
|                                                                          |                   | $V_{CC} = 2.0\text{ V}$                                       | 75                  | -   | -   | ns   |
|                                                                          |                   | $V_{CC} = 4.5\text{ V}$                                       | 15                  | -   | -   | ns   |
|                                                                          |                   | $V_{CC} = 6.0\text{ V}$                                       | 13                  | -   | -   | ns   |

**Table 8. Dynamic characteristics 74HC373 ...continued**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

| Symbol | Parameter | Conditions                              | Min | Typ | Max | Unit |
|--------|-----------|-----------------------------------------|-----|-----|-----|------|
| $t_h$  | hold time | Dn to LE; see <a href="#">Figure 11</a> |     |     |     |      |
|        |           | $V_{CC} = 2.0$ V                        | 5   | -   | -   | ns   |
|        |           | $V_{CC} = 4.5$ V                        | 5   | -   | -   | ns   |
|        |           | $V_{CC} = 6.0$ V                        | 5   | -   | -   | ns   |

[1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .

[2]  $t_{en}$  is the same as  $t_{PZH}$  and  $t_{PZL}$ .

[3]  $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .

[4]  $t_t$  is the same as  $t_{THL}$  and  $t_{TLH}$ .

[5]  $C_{PD}$  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;

$C_L$  = output load capacitance in pF;

$V_{CC}$  = supply voltage in V;

$N$  = number of inputs switching;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

**Table 9. Dynamic characteristics 74HCT373**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

| Symbol                              | Parameter                     | Conditions                                                    | Min | Typ | Max | Unit |
|-------------------------------------|-------------------------------|---------------------------------------------------------------|-----|-----|-----|------|
| <b><math>T_{amb} = 25</math> °C</b> |                               |                                                               |     |     |     |      |
| $t_{pd}$                            | propagation delay             | Dn to Qn; see <a href="#">Figure 8</a>                        | [1] |     |     |      |
|                                     |                               | $V_{CC} = 4.5$ V                                              | -   | 17  | 30  | ns   |
|                                     |                               | $V_{CC} = 5$ V; $C_L = 15$ pF                                 | -   | 14  | -   | ns   |
|                                     |                               | LE to Qn; see <a href="#">Figure 9</a>                        |     |     |     |      |
|                                     |                               | $V_{CC} = 4.5$ V                                              | -   | 16  | 32  | ns   |
|                                     |                               | $V_{CC} = 5$ V; $C_L = 15$ pF                                 | -   | 13  | -   | ns   |
| $t_{en}$                            | enable time                   | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | [2] |     |     |      |
|                                     |                               | $V_{CC} = 4.5$ V                                              | -   | 19  | 32  | ns   |
| $t_{dis}$                           | disable time                  | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | [3] |     |     |      |
|                                     |                               | $V_{CC} = 4.5$ V                                              | -   | 18  | 30  | ns   |
| $t_t$                               | transition time               | Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> | [4] |     |     |      |
|                                     |                               | $V_{CC} = 4.5$ V                                              | -   | 5   | 12  | ns   |
| $t_W$                               | pulse width                   | LE HIGH; see <a href="#">Figure 9</a>                         |     |     |     |      |
|                                     |                               | $V_{CC} = 4.5$ V                                              | 16  | 4   | -   | ns   |
| $t_{su}$                            | set-up time                   | Dn to LE; see <a href="#">Figure 11</a>                       |     |     |     |      |
|                                     |                               | $V_{CC} = 4.5$ V                                              | 12  | 6   | -   | ns   |
| $t_h$                               | hold time                     | Dn to LE; see <a href="#">Figure 11</a>                       |     |     |     |      |
|                                     |                               | $V_{CC} = 4.5$ V                                              | 4   | -1  | -   | ns   |
| $C_{PD}$                            | power dissipation capacitance | per latch;<br>$V_I = GND$ to $(V_{CC} - 1.5$ V)               | [5] | -   | 41  | pF   |

**Table 9.** Dynamic characteristics 74HCT373 ...continued

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

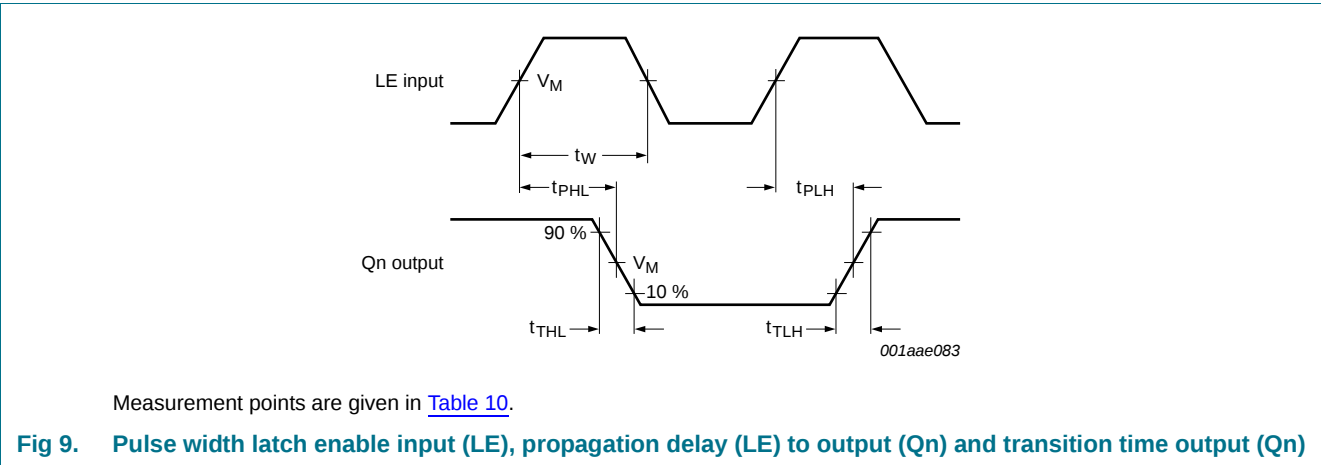
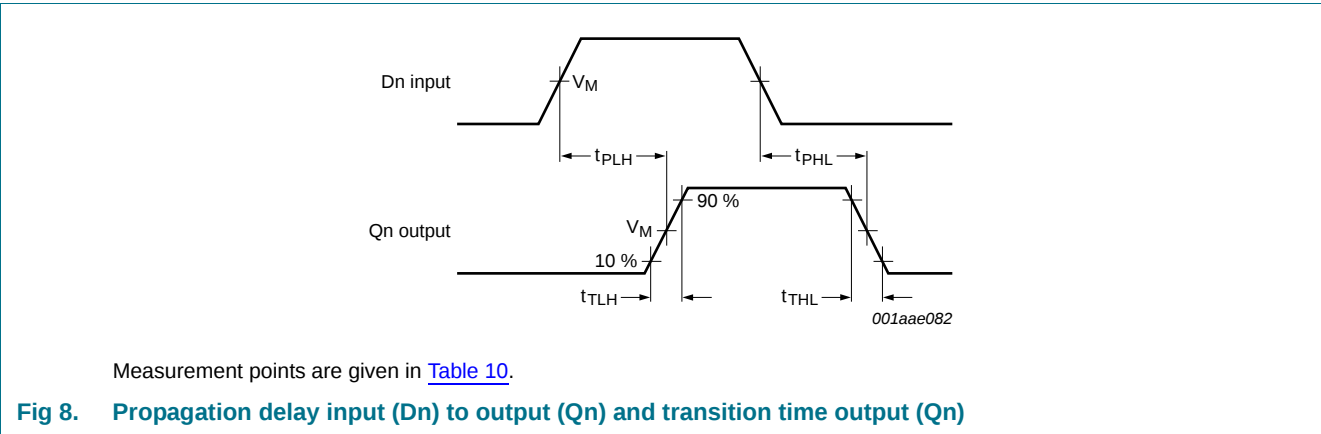
| Symbol                                                        | Parameter            | Conditions                                                    | Min                 | Typ | Max | Unit |
|---------------------------------------------------------------|----------------------|---------------------------------------------------------------|---------------------|-----|-----|------|
| <b><math>T_{amb} = -40\text{ °C to }+85\text{ °C}</math></b>  |                      |                                                               |                     |     |     |      |
| $t_{pd}$                                                      | propagation delay    | Dn to Qn; see <a href="#">Figure 8</a>                        | <a href="#">[1]</a> |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 38  | ns   |
|                                                               |                      | LE to Qn; see <a href="#">Figure 9</a>                        |                     |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 40  | ns   |
| $t_{en}$                                                      | enable time          | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | <a href="#">[2]</a> |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 40  | ns   |
| $t_{dis}$                                                     | disable time         | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | <a href="#">[3]</a> |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 38  | ns   |
| $t_t$                                                         | transition time      | Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> | <a href="#">[4]</a> |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 15  | ns   |
| $t_W$                                                         | pulse width          | LE HIGH; see <a href="#">Figure 9</a>                         |                     |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | 20                  | -   | -   | ns   |
| $t_{su}$                                                      | set-up time          | Dn to LE; see <a href="#">Figure 11</a>                       |                     |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | 15                  | -   | -   | ns   |
| $t_h$                                                         | hold time            | Dn to LE; see <a href="#">Figure 11</a>                       |                     |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | 4                   | -   | -   | ns   |
| <b><math>T_{amb} = -40\text{ °C to }+125\text{ °C}</math></b> |                      |                                                               |                     |     |     |      |
| $t_{pd}$                                                      | propagation delay    | Dn to Qn; see <a href="#">Figure 8</a>                        | <a href="#">[1]</a> |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 45  | ns   |
|                                                               |                      | LE to Qn; see <a href="#">Figure 9</a>                        |                     |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 48  | ns   |
| $t_{en}$                                                      | enable time          | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | <a href="#">[2]</a> |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 48  | ns   |
| $t_{dis}$                                                     | disable time         | $\overline{OE}$ to Qn; see <a href="#">Figure 10</a>          | <a href="#">[3]</a> |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 45  | ns   |
| $t_t$                                                         | transition time      | Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> | <a href="#">[4]</a> |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | -                   | -   | 18  | ns   |
| $t_W$                                                         | pulse width          | LE HIGH; see <a href="#">Figure 9</a>                         |                     |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | 24                  | -   | -   | ns   |
| $t_{su}$                                                      | set-up time Dn to LE | Dn to LE; see <a href="#">Figure 11</a>                       |                     |     |     |      |
|                                                               |                      | $V_{CC} = 4.5\text{ V}$                                       | 18                  | -   | -   | ns   |

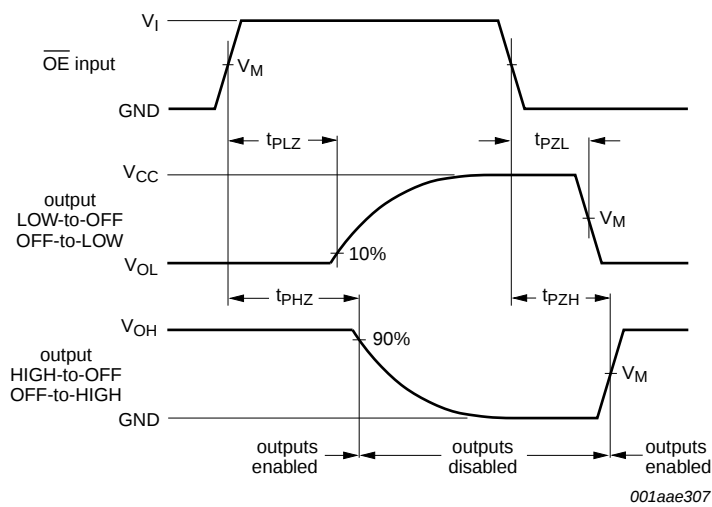
**Table 9. Dynamic characteristics 74HCT373 ...continued**  
 Voltages are referenced to GND (ground = 0 V);  $C_L = 50\text{ pF}$  unless otherwise specified; for test circuit see [Figure 12](#).

| Symbol | Parameter          | Conditions                              | Min | Typ | Max | Unit |
|--------|--------------------|-----------------------------------------|-----|-----|-----|------|
| $t_h$  | hold time Dn to LE | Dn to LE; see <a href="#">Figure 11</a> |     |     |     |      |
|        |                    | $V_{CC} = 4.5\text{ V}$                 | 4   | -   | -   | ns   |

- [1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .  
 [2]  $t_{en}$  is the same as  $t_{PZH}$  and  $t_{PZL}$ .  
 [3]  $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .  
 [4]  $t_i$  is the same as  $t_{THL}$  and  $t_{TLH}$ .  
 [5]  $C_{PD}$  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;  
 $C_L$  = output load capacitance in pF;  
 $V_{CC}$  = supply voltage in V;  
 $N$  = number of inputs switching;  
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

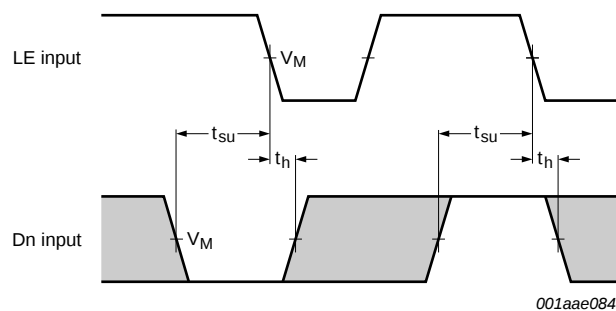
11. Waveforms





Measurement points are given in [Table 10](#).

Fig 10. 3-state enable and disable time



Measurement points are given in [Table 10](#).

Fig 11. Set-up and hold time data input (Dn) to latch enable input (LE)

Table 10. Measurement points

| Type     | Input       | Output      |
|----------|-------------|-------------|
|          | $V_M$       | $V_M$       |
| 74HC373  | $0.5V_{CC}$ | $0.5V_{CC}$ |
| 74HCT373 | 1.3 V       | 1.3 V       |

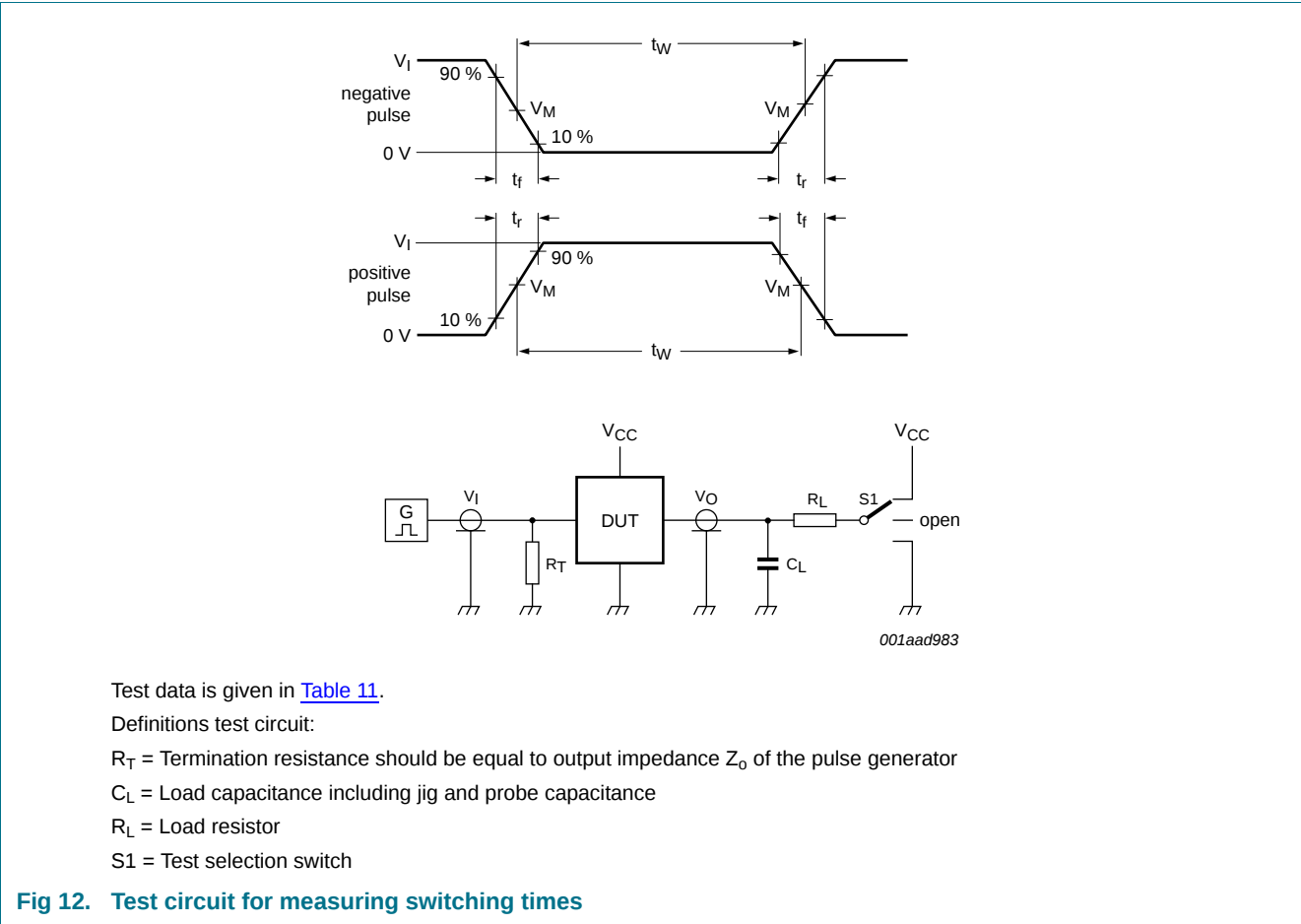


Table 11. Test data

| Type     | Input    |            | Load         |              | S1 position        |                    |                    |
|----------|----------|------------|--------------|--------------|--------------------|--------------------|--------------------|
|          | $V_I$    | $t_r, t_f$ | $C_L$        | $R_L$        | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 74HC373  | $V_{CC}$ | 6 ns       | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |
| 74HCT373 | 3 V      | 6 ns       | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |

12. Package outline

DIP20: plastic dual in-line package; 20 leads (300 mil)

SOT146-1

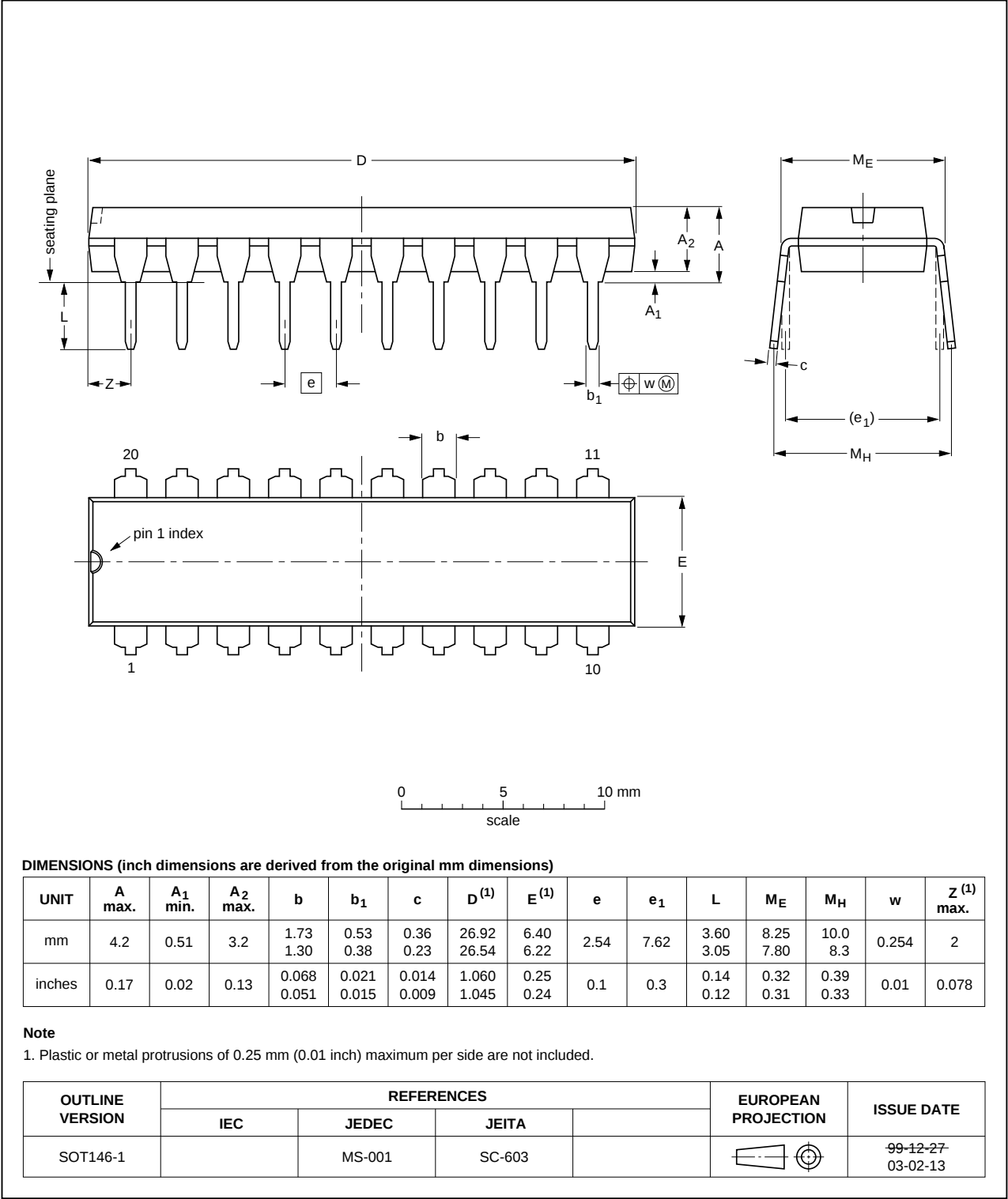


Fig 13. Package outline SOT146-1 (DIP20)

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

SOT163-1

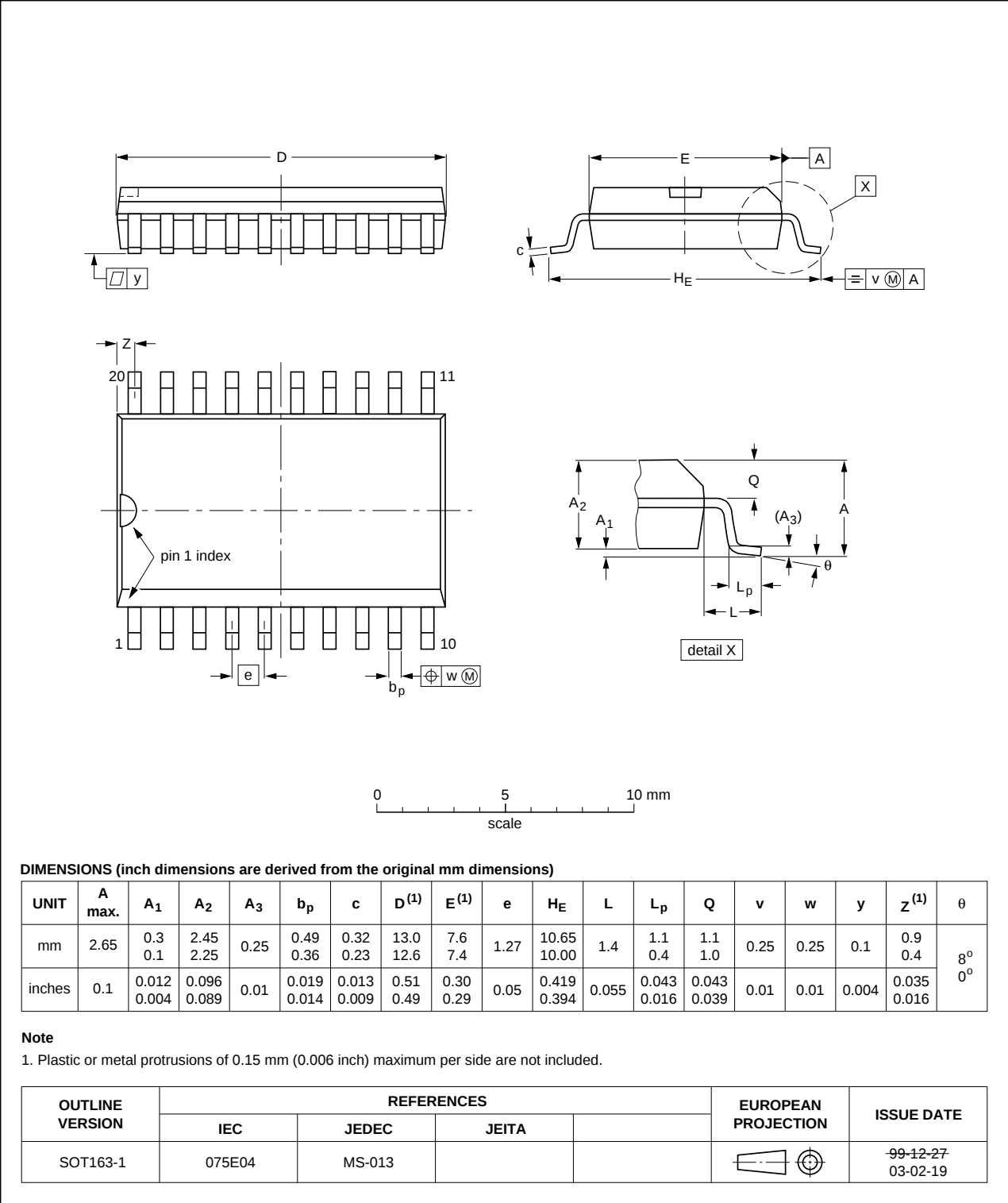


Fig 14. Package outline SOT163-1 (SO20)

SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

SOT339-1

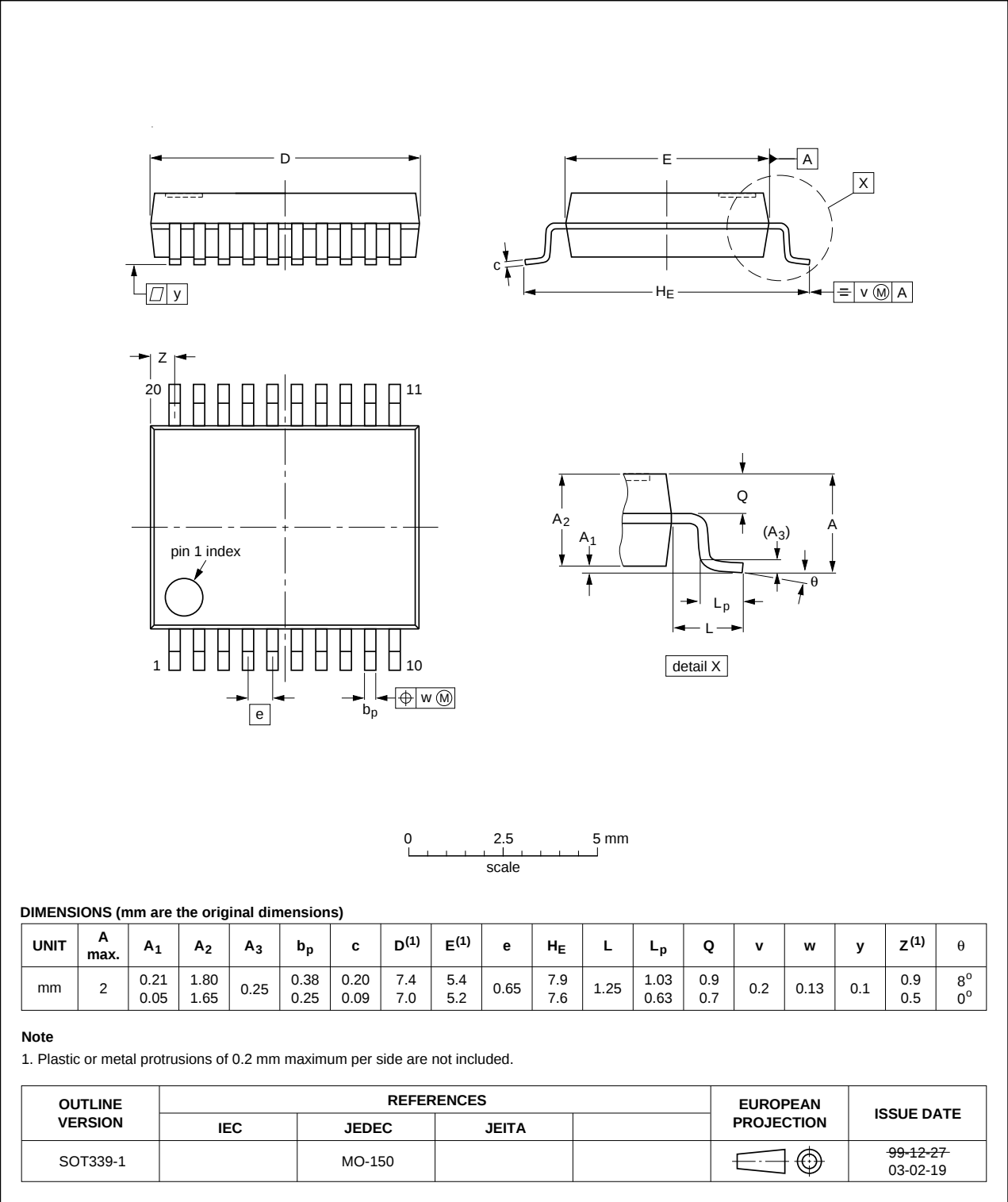


Fig 15. Package outline SOT339-1 (SSOP20)

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

SOT360-1

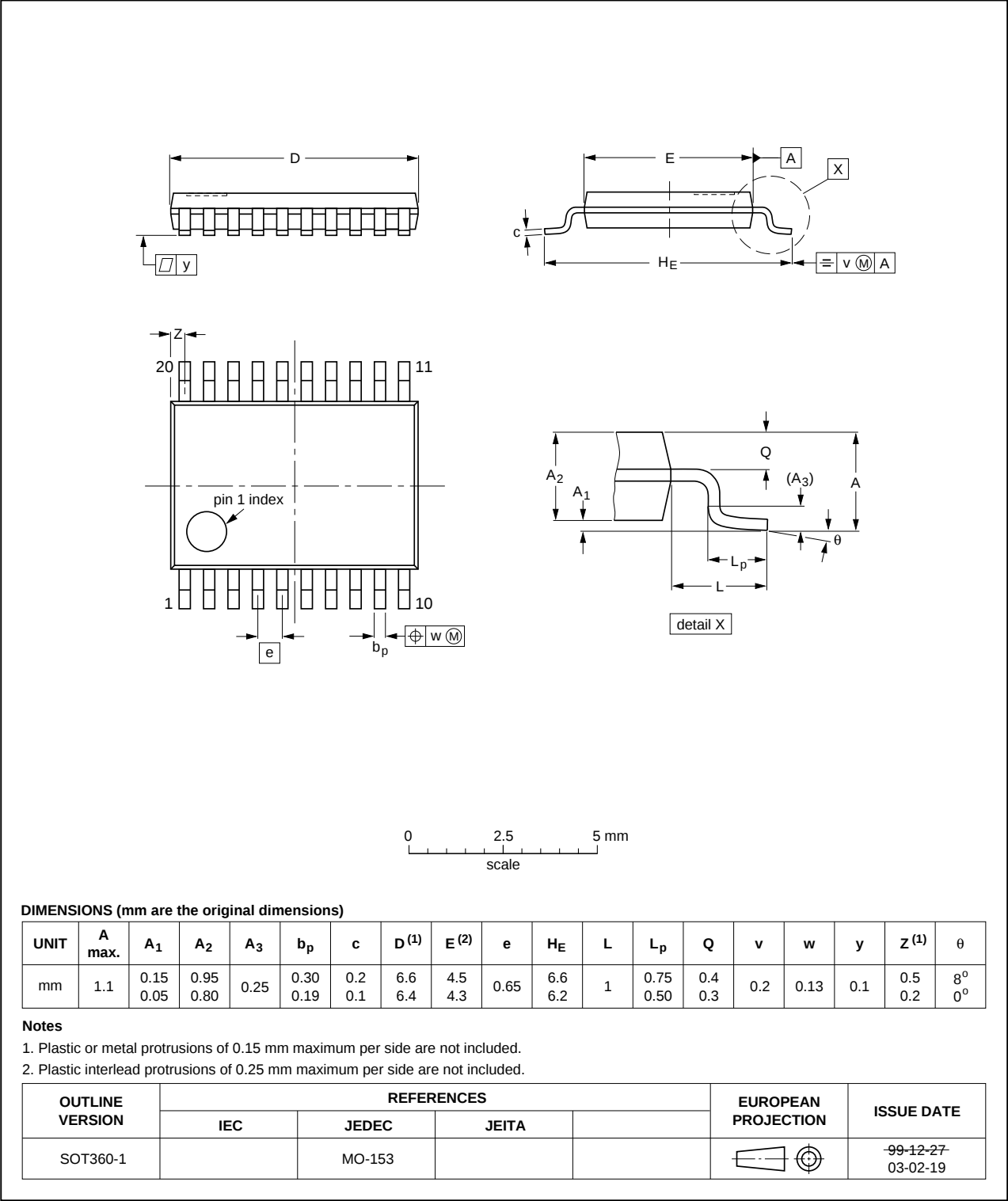


Fig 16. Package outline SOT360-1 (TSSOP20)

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

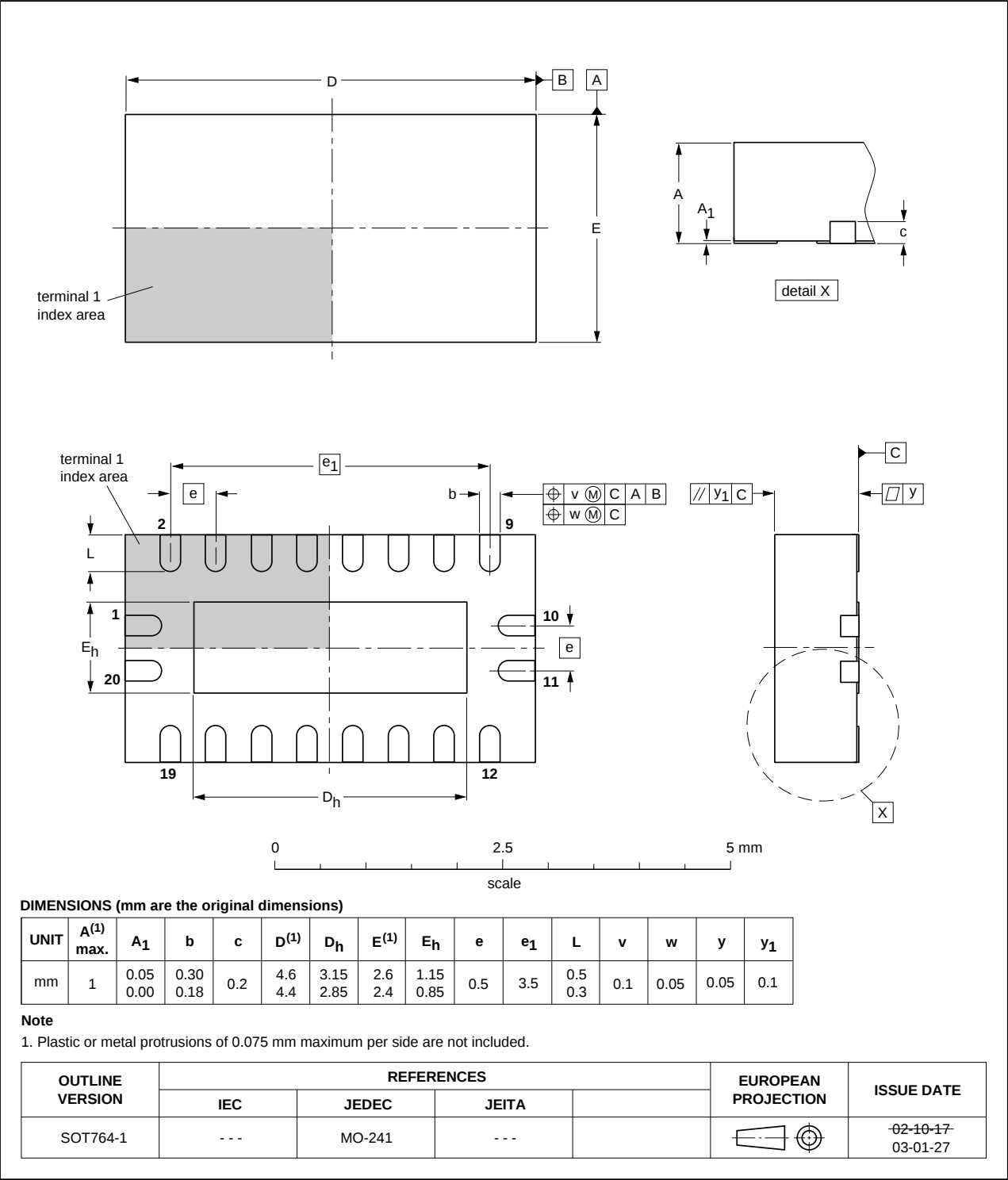


Fig 17. Package outline SOT764-1 (DHVQFN20)

## 13. Abbreviations

Table 12. Abbreviations

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

## 14. Revision history

Table 13. Revision history

| Document ID         | Release date           | Data sheet status     | Change notice | Supersedes          |
|---------------------|------------------------|-----------------------|---------------|---------------------|
| 74HC_HCT373 v.5     | 20111213               | Product data sheet    | -             | 74HC_HCT373 v.4     |
| Modifications:      | • Legal pages updated. |                       |               |                     |
| 74HC_HCT373 v.4     | 20100903               | Product data sheet    | -             | 74HC_HCT373 v.3     |
| 74HC_HCT373 v.3     | 20060120               | Product data sheet    | -             | 74HC_HCT373_CNV v.2 |
| 74HC_HCT373_CNV v.2 | 19970827               | Product specification | -             | -                   |

## 15. Legal information

### 15.1 Data sheet status

| 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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