

# 74HC373; 74HCT373

Octal D-type transparent latch; 3-state

Rev. 03 — 20 January 2006

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; HCT373 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:

- 74HC533; 74HCT533: but inverted outputs
- 74HC563; 74HCT563: but inverted outputs and different pin arrangement
- 74HC573; 74HCT573: but different pin arrangement

## 2. Features

- 3-state non-inverting outputs for bus oriented applications
- Common 3-state output enable input
- Functionally identical to the 74HC563; 74HCT563, 74HC573; 74HCT573 and 74HC533; 74HCT533
- ESD protection:
  - ◆ HBM EIA/JESD22-A114-C exceeds 2 000 V
  - ◆ MM EIA/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  $+125\text{ }^{\circ}\text{C}$

**PHILIPS**

### 3. Quick reference data

**Table 1: Quick reference data**

$GND = 0\text{ V}$ ;  $T_{amb} = 25\text{ °C}$ ;  $t_r = t_f = 6\text{ ns}$ .

| Symbol                           | Parameter                     | Conditions                                                                | Min   | Typ | Max | Unit |
|----------------------------------|-------------------------------|---------------------------------------------------------------------------|-------|-----|-----|------|
| 74HC373                          |                               |                                                                           |       |     |     |      |
| $t_{\text{PHL}}, t_{\text{PLH}}$ | propagation delay             | $V_{\text{CC}} = 5\text{ V}; C_{\text{L}} = 15\text{ pF}$                 |       |     |     |      |
|                                  | Dn to Qn                      |                                                                           | -     | 12  | -   | ns   |
|                                  | LE to Qn                      |                                                                           | -     | 15  | -   | ns   |
| $C_{\text{i}}$                   | input capacitance             |                                                                           | -     | 3.5 | -   | pF   |
| $C_{\text{PD}}$                  | power dissipation capacitance | per latch; $V_{\text{I}} = \text{GND to } V_{\text{CC}}$                  | [1] - | 45  | -   | pF   |
| 74HCT373                         |                               |                                                                           |       |     |     |      |
| $t_{\text{PHL}}, t_{\text{PLH}}$ | propagation delay             | $V_{\text{CC}} = 5\text{ V}; C_{\text{L}} = 15\text{ pF}$                 |       |     |     |      |
|                                  | Dn to Qn                      |                                                                           | -     | 14  | -   | ns   |
|                                  | LE to Qn                      |                                                                           | -     | 13  | -   | ns   |
| $C_{\text{i}}$                   | input capacitance             |                                                                           | -     | 3.5 | -   | pF   |
| $C_{\text{PD}}$                  | power dissipation capacitance | per latch; $V_{\text{I}} = \text{GND to } (V_{\text{CC}} - 1.5\text{ V})$ | [1] - | 41  | -   | pF   |

[1]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  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.

### 4. Ordering information

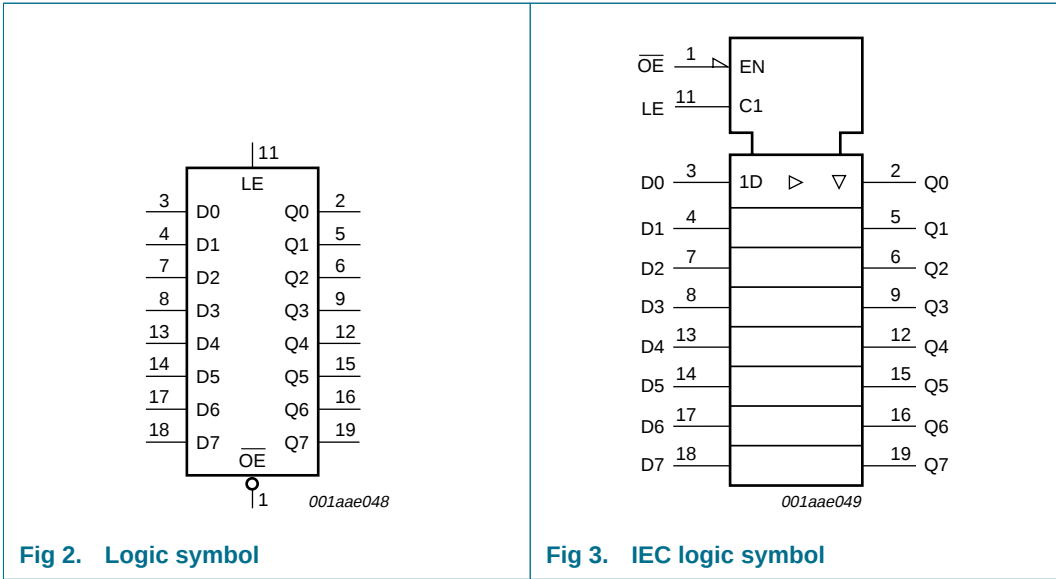
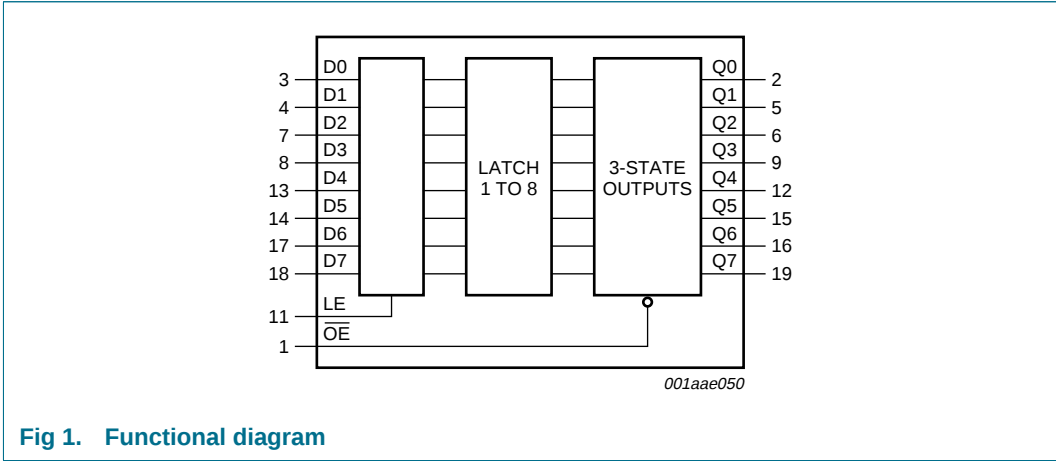
**Table 2: Ordering information**

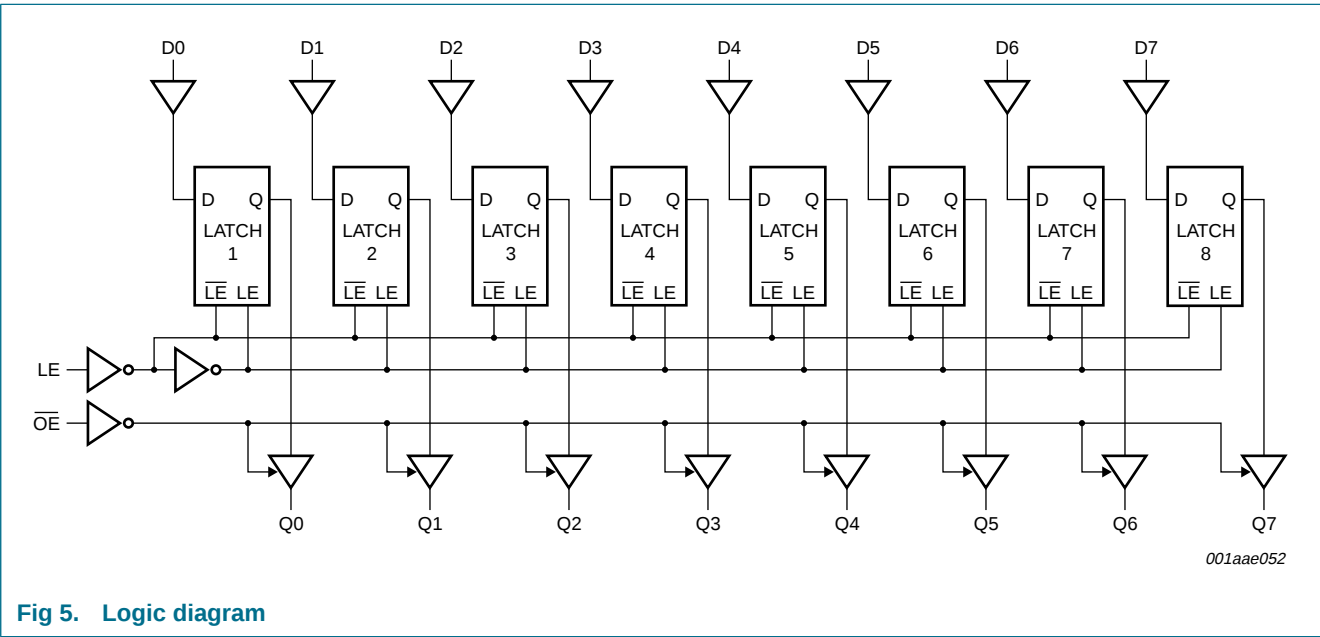
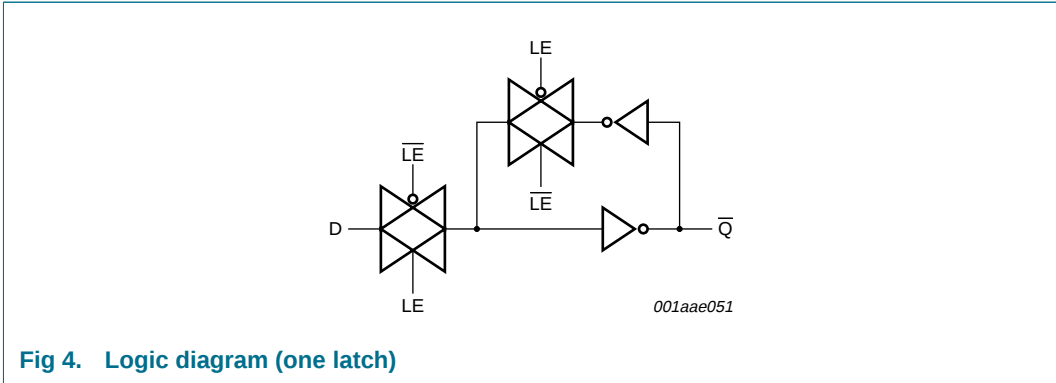
| Type number    | Package           |          |                                                                                                                                   |          |
|----------------|-------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------|----------|
|                | Temperature range | Name     | Description                                                                                                                       | Version  |
| <b>74HC373</b> |                   |          |                                                                                                                                   |          |
| 74HC373N       | -40 °C to +125 °C | DIP20    | plastic dual in-line package; 20 leads (300 mil)                                                                                  | SOT146-1 |
| 74HC373D       | -40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm                                                                     | SOT163-1 |
| 74HC373DB      | -40 °C to +125 °C | SSOP20   | plastic shrink small outline package; 20 leads;<br>body width 5.3 mm                                                              | SOT339-1 |
| 74HC373PW      | -40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm                                                         | SOT360-1 |
| 74HC373BQ      | -40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals;<br>body 2.5 × 4.5 × 0.85 mm | SOT764-1 |

Table 2: Ordering information ...continued

| Type number     | Package           |          |                                                                                                                                   |          |
|-----------------|-------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------|----------|
|                 | Temperature range | Name     | Description                                                                                                                       | Version  |
| <b>74HCT373</b> |                   |          |                                                                                                                                   |          |
| 74HCT373N       | −40 °C to +125 °C | DIP20    | plastic dual in-line package; 20 leads (300 mil)                                                                                  | SOT146-1 |
| 74HCT373D       | −40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm                                                                     | SOT163-1 |
| 74HCT373DB      | −40 °C to +125 °C | SSOP20   | plastic shrink small outline package; 20 leads;<br>body width 5.3 mm                                                              | SOT339-1 |
| 74HCT373PW      | −40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm                                                         | SOT360-1 |
| 74HCT373BQ      | −40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals;<br>body 2.5 × 4.5 × 0.85 mm | SOT764-1 |

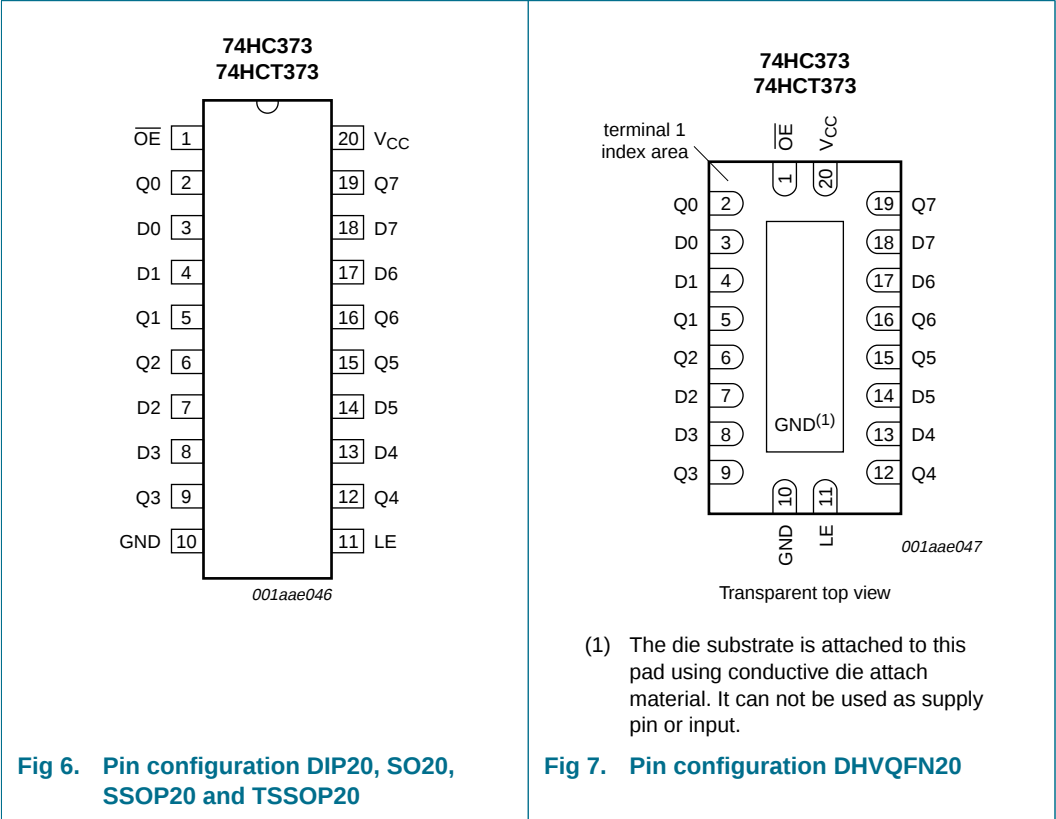
5. Functional diagram





6. Pinning information

6.1 Pinning



6.2 Pin description

Table 3: Pin description

| Symbol | Pin | Description                              |
|--------|-----|------------------------------------------|
| OE     | 1   | 3-state output enable input (active LOW) |
| Q0     | 2   | 3-state latch output 0                   |
| D0     | 3   | data input 0                             |
| D1     | 4   | data input 1                             |
| Q1     | 5   | 3-state latch output 1                   |
| Q2     | 6   | 3-state latch output 2                   |
| D2     | 7   | data input 2                             |
| D3     | 8   | data input 3                             |
| Q3     | 9   | 3-state latch output 3                   |
| GND    | 10  | ground (0 V)                             |
| LE     | 11  | latch enable input (active HIGH)         |
| Q4     | 12  | 3-state latch output 4                   |
| D4     | 13  | data input 4                             |
| D5     | 14  | data input 5                             |

Table 3: Pin description ...continued

| Symbol          | Pin | Description            |
|-----------------|-----|------------------------|
| Q5              | 15  | 3-state latch output 5 |
| Q6              | 16  | 3-state latch output 6 |
| D6              | 17  | data input 6           |
| D7              | 18  | data input 7           |
| Q7              | 19  | 3-state latch output 7 |
| V <sub>CC</sub> | 20  | supply voltage         |

## 7. Functional description

### 7.1 Function table

Table 4: Function table [\[1\]](#)

| Operating mode                              | Control         |    | Input | Internal latches | Output |
|---------------------------------------------|-----------------|----|-------|------------------|--------|
|                                             | $\overline{OE}$ | 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.

## 8. Limiting values

**Table 5: 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       | V    |
| $I_{IK}$  | input clamping current   | $V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$    | -     | $\pm 20$ | mA   |
| $I_{OK}$  | output clamping current  | $V_O < -0.5\text{ V}$ or<br>$V_O > V_{CC} + 0.5\text{ V}$ | -     | $\pm 20$ | mA   |
| $I_O$     | output current           | $V_O = -0.5\text{ V}$ to $(V_{CC} + 0.5\text{ V})$        | -     | $\pm 35$ | mA   |
| $I_{CC}$  | quiescent supply current |                                                           | -     | +70      | mA   |
| $I_{GND}$ | ground current           |                                                           | -     | -70      | mA   |
| $T_{stg}$ | storage temperature      |                                                           | -65   | +150     | °C   |
| $P_{tot}$ | 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:  $P_{tot}$  derates linearly with 12 mW/K above 70 °C.

[2] For SO20:  $P_{tot}$  derates linearly with 8 mW/K above 70 °C.

[3] For SSOP20 and TSSOP20 packages:  $P_{tot}$  derates linearly with 5.5 mW/K above 60 °C.

[4] For DHVQFN20 package:  $P_{tot}$  derates linearly with 4.5 mW/K above 60 °C.

## 9. Recommended operating conditions

**Table 6: Recommended operating conditions**

| Symbol          | Parameter                | Conditions              | Min | Typ | Max      | Unit |
|-----------------|--------------------------|-------------------------|-----|-----|----------|------|
| <b>74HC373</b>  |                          |                         |     |     |          |      |
| $V_{CC}$        | supply voltage           |                         | 2.0 | 5.0 | 6.0      | V    |
| $V_I$           | input voltage            |                         | 0   | -   | $V_{CC}$ | V    |
| $V_O$           | output voltage           |                         | 0   | -   | $V_{CC}$ | V    |
| $T_{amb}$       | ambient temperature      |                         | -40 | +25 | +125     | °C   |
| $t_r, t_f$      | input rise and fall time | $V_{CC} = 2.0\text{ V}$ | -   | -   | 1000     | ns   |
|                 |                          | $V_{CC} = 4.5\text{ V}$ | -   | 6.0 | 500      | ns   |
|                 |                          | $V_{CC} = 6.0\text{ V}$ | -   | -   | 400      | ns   |
| <b>74HCT373</b> |                          |                         |     |     |          |      |
| $V_{CC}$        | supply voltage           |                         | 4.5 | 5.0 | 5.5      | V    |
| $V_I$           | input voltage            |                         | 0   | -   | $V_{CC}$ | V    |
| $V_O$           | output voltage           |                         | 0   | -   | $V_{CC}$ | V    |
| $T_{amb}$       | ambient temperature      |                         | -40 | +25 | +125     | °C   |
| $t_r, t_f$      | input rise and fall time | $V_{CC} = 4.5\text{ V}$ | -   | 6.0 | 500      | ns   |

## 10. Static characteristics

**Table 7: Static characteristics 74HC373**

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-state 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-state 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-state 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-state 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>LI</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>                           | quiescent 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   |
| <b>T<sub>amb</sub> = -40 °C to +85 °C</b> |                           |                                                                                                                           |      |      |      |      |
| V <sub>IH</sub>                           | HIGH-state 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-state 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-state 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    |

**Table 7: 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-state 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>LI</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>                            | quiescent 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-state 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-state 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-state 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    |
| V <sub>OL</sub>                            | LOW-state 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>LI</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>                            | quiescent 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 8: 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-state input voltage            | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | 2.0  | 1.6  | -    | V    |
| V <sub>IL</sub>                           | LOW-state input voltage             | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | -    | 1.2  | 0.8  | V    |
| V <sub>OH</sub>                           | HIGH-state 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-state 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>LI</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>                           | quiescent 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 quiescent 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   |
|                                           | 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-state input voltage            | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | 2.0  | -    | -    | V    |
| V <sub>IL</sub>                           | LOW-state input voltage             | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | -    | -    | 0.8  | V    |
| V <sub>OH</sub>                           | HIGH-state 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-state 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>LI</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>                           | quiescent 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 quiescent 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   |

**Table 8:** Static characteristics 74HCT373 ...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 +125 °C</b> |                                     |                                                                                                                                                                                                          |     |     |      |      |
| V <sub>IH</sub>                            | HIGH-state input voltage            | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | 2.0 | -   | -    | V    |
| V <sub>IL</sub>                            | LOW-state input voltage             | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                                                                         | -   | -   | 0.8  | V    |
| V <sub>OH</sub>                            | HIGH-state 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-state 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>LI</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>                            | quiescent 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 quiescent 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   |
|                                            |                                     | $\overline{\text{OE}}$                                                                                                                                                                                   | -   | -   | 490  | µA   |

## 11. Dynamic characteristics

**Table 9:** Dynamic characteristics 74HC373Voltages are referenced to GND (ground = 0 V); C<sub>L</sub> = 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>PHL</sub> ,<br>t <sub>PLH</sub> | propagation delay |                                               |     |     |     |      |
|                                        | Dn to Qn          | see <a href="#">Figure 8</a>                  |     |     |     |      |
|                                        |                   | 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   |

**Table 9: 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 |
|-------------------------------------------------------------|---------------------------------------------------|------------------------------------------|-----------------------|-----|-----|------|
| $t_{PZH}$ ,<br>$t_{PZL}$                                    | 3-state output enable time $\overline{OE}$ to Qn  | see <a href="#">Figure 10</a>            |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | -                     | 44  | 150 | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | -                     | 16  | 30  | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | -                     | 13  | 26  | ns   |
| $t_{PHZ}$ ,<br>$t_{PLZ}$                                    | 3-state output disable time $\overline{OE}$ to Qn | see <a href="#">Figure 10</a>            |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | -                     | 47  | 150 | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | -                     | 17  | 30  | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | -                     | 14  | 26  | ns   |
| $t_{THL}$ ,<br>$t_{TLH}$                                    | output transition time                            | see <a href="#">Figure 9</a>             |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | -                     | 14  | 60  | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | -                     | 5   | 12  | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | -                     | 4   | 10  | ns   |
| $t_W$                                                       | pulse width LE HIGH                               | see <a href="#">Figure 9</a>             |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | 80                    | 17  | -   | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | 16                    | 6   | -   | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | 14                    | 5   | -   | ns   |
| $t_{su}$                                                    | set-up time Dn to LE                              | see <a href="#">Figure 11</a>            |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | 50                    | 14  | -   | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | 10                    | 5   | -   | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | 9                     | 4   | -   | ns   |
| $t_h$                                                       | hold time Dn to LE                                | see <a href="#">Figure 11</a>            |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | +5                    | -8  | -   | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | +5                    | -3  | -   | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | +5                    | -2  | -   | ns   |
| $C_{PD}$                                                    | power dissipation capacitance                     | per latch; $V_I = \text{GND to } V_{CC}$ | <a href="#">[1]</a> - | 45  | -   | pF   |
| <b><math>T_{amb} = -40</math> °C to <math>+85</math> °C</b> |                                                   |                                          |                       |     |     |      |
| $t_{PHL}$ ,<br>$t_{PLH}$                                    | propagation delay                                 |                                          |                       |     |     |      |
|                                                             | Dn to Qn                                          | see <a href="#">Figure 8</a>             |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | -                     | -   | 190 | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | -                     | -   | 38  | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | -                     | -   | 33  | ns   |
|                                                             | LE to Qn                                          | see <a href="#">Figure 9</a>             |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | -                     | -   | 220 | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | -                     | -   | 44  | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | -                     | -   | 37  | ns   |
| $t_{PZH}$ ,<br>$t_{PZL}$                                    | 3-state output enable time $\overline{OE}$ to Qn  | see <a href="#">Figure 10</a>            |                       |     |     |      |
|                                                             |                                                   | $V_{CC} = 2.0$ V                         | -                     | -   | 190 | ns   |
|                                                             |                                                   | $V_{CC} = 4.5$ V                         | -                     | -   | 38  | ns   |
|                                                             |                                                   | $V_{CC} = 6.0$ V                         | -                     | -   | 33  | ns   |

**Table 9: 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 |
|--------------------------------------------------------------|---------------------------------------------------|-------------------------------|-----|-----|-----|------|
| $t_{PHZ}$ ,<br>$t_{PLZ}$                                     | 3-state output disable time $\overline{OE}$ to Qn | see <a href="#">Figure 10</a> |     |     |     |      |
|                                                              |                                                   | $V_{CC} = 2.0$ V              | -   | -   | 190 | ns   |
|                                                              |                                                   | $V_{CC} = 4.5$ V              | -   | -   | 38  | ns   |
|                                                              |                                                   | $V_{CC} = 6.0$ V              | -   | -   | 33  | ns   |
| $t_{THL}$ ,<br>$t_{TLH}$                                     | output transition time                            | see <a href="#">Figure 8</a>  |     |     |     |      |
|                                                              |                                                   | $V_{CC} = 2.0$ V              | -   | -   | 75  | ns   |
|                                                              |                                                   | $V_{CC} = 4.5$ V              | -   | -   | 15  | ns   |
|                                                              |                                                   | $V_{CC} = 6.0$ V              | -   | -   | 13  | ns   |
| $t_W$                                                        | pulse width LE HIGH                               | see <a href="#">Figure 9</a>  |     |     |     |      |
|                                                              |                                                   | $V_{CC} = 2.0$ V              | 100 | -   | -   | ns   |
|                                                              |                                                   | $V_{CC} = 4.5$ V              | 20  | -   | -   | ns   |
|                                                              |                                                   | $V_{CC} = 6.0$ V              | 17  | -   | -   | ns   |
| $t_{su}$                                                     | set-up time Dn to LE                              | see <a href="#">Figure 11</a> |     |     |     |      |
|                                                              |                                                   | $V_{CC} = 2.0$ V              | 65  | -   | -   | ns   |
|                                                              |                                                   | $V_{CC} = 4.5$ V              | 13  | -   | -   | ns   |
|                                                              |                                                   | $V_{CC} = 6.0$ V              | 11  | -   | -   | ns   |
| $t_h$                                                        | 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   |
| <b><math>T_{amb} = -40</math> °C to <math>+125</math> °C</b> |                                                   |                               |     |     |     |      |
| $t_{PHL}$ ,<br>$t_{PLH}$                                     | propagation delay                                 |                               |     |     |     |      |
|                                                              | Dn to Qn                                          | see <a href="#">Figure 8</a>  |     |     |     |      |
|                                                              |                                                   | $V_{CC} = 2.0$ V              | -   | -   | 225 | ns   |
|                                                              |                                                   | $V_{CC} = 4.5$ V              | -   | -   | 45  | ns   |
|                                                              |                                                   | $V_{CC} = 6.0$ V              | -   | -   | 38  | ns   |
|                                                              | LE to Qn                                          | see <a href="#">Figure 9</a>  |     |     |     |      |
|                                                              |                                                   | $V_{CC} = 2.0$ V              | -   | -   | 265 | ns   |
|                                                              |                                                   | $V_{CC} = 4.5$ V              | -   | -   | 53  | ns   |
|                                                              |                                                   | $V_{CC} = 6.0$ V              | -   | -   | 45  | ns   |
| $t_{PZH}$ ,<br>$t_{PZL}$                                     | 3-state output enable time $\overline{OE}$ to Qn  | see <a href="#">Figure 10</a> |     |     |     |      |
|                                                              |                                                   | $V_{CC} = 2.0$ V              | -   | -   | 225 | ns   |
|                                                              |                                                   | $V_{CC} = 4.5$ V              | -   | -   | 45  | ns   |
|                                                              |                                                   | $V_{CC} = 6.0$ V              | -   | -   | 38  | ns   |
| $t_{PHZ}$ ,<br>$t_{PLZ}$                                     | 3-state output disable time $\overline{OE}$ to Qn | see <a href="#">Figure 10</a> |     |     |     |      |
|                                                              |                                                   | $V_{CC} = 2.0$ V              | -   | -   | 225 | ns   |
|                                                              |                                                   | $V_{CC} = 4.5$ V              | -   | -   | 45  | ns   |
|                                                              |                                                   | $V_{CC} = 6.0$ V              | -   | -   | 38  | ns   |

**Table 9: 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 |
|--------------------------|------------------------|-------------------------------|-----|-----|-----|------|
| $t_{THL}$ ,<br>$t_{TLH}$ | output transition time | see <a href="#">Figure 8</a>  |     |     |     |      |
|                          |                        | $V_{CC} = 2.0$ V              | -   | -   | 90  | ns   |
|                          |                        | $V_{CC} = 4.5$ V              | -   | -   | 18  | ns   |
|                          |                        | $V_{CC} = 6.0$ V              | -   | -   | 15  | ns   |
| $t_W$                    | pulse width LE HIGH    | see <a href="#">Figure 9</a>  |     |     |     |      |
|                          |                        | $V_{CC} = 2.0$ V              | 120 | -   | -   | ns   |
|                          |                        | $V_{CC} = 4.5$ V              | 24  | -   | -   | ns   |
|                          |                        | $V_{CC} = 6.0$ V              | 20  | -   | -   | ns   |
| $t_{su}$                 | set-up time Dn to LE   | see <a href="#">Figure 11</a> |     |     |     |      |
|                          |                        | $V_{CC} = 2.0$ V              | 75  | -   | -   | ns   |
|                          |                        | $V_{CC} = 4.5$ V              | 15  | -   | -   | ns   |
|                          |                        | $V_{CC} = 6.0$ V              | 13  | -   | -   | ns   |
| $t_h$                    | 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]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu$ W).

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

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

**Table 10: 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> |                                                   |                                                 |     |     |     |      |
| $t_{PHL}$ ,<br>$t_{PLH}$            | propagation delay                                 |                                                 |     |     |     |      |
|                                     | Dn to Qn                                          | see <a href="#">Figure 8</a>                    |     |     |     |      |
|                                     |                                                   | $V_{CC} = 4.5$ 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   |
| $t_{PZH}$ ,<br>$t_{PZL}$            | 3-state output enable time $\overline{OE}$ to Qn  | $V_{CC} = 4.5$ V; see <a href="#">Figure 10</a> | -   | 19  | 32  | ns   |
| $t_{PHZ}$ ,<br>$t_{PLZ}$            | 3-state output disable time $\overline{OE}$ to Qn | $V_{CC} = 4.5$ V; see <a href="#">Figure 10</a> | -   | 18  | 30  | ns   |
| $t_{THL}$ ,<br>$t_{TLH}$            | output transition time                            | $V_{CC} = 4.5$ V; see <a href="#">Figure 8</a>  | -   | 5   | 12  | ns   |

**Table 10: 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 |
|----------|-------------------------------|---------------------------------------------------------------|-------|-----|-----|------|
| $t_W$    | pulse width LE HIGH           | $V_{CC} = 4.5$ V; see <a href="#">Figure 9</a>                | 16    | 4   | -   | ns   |
| $t_{su}$ | set-up time Dn to LE          | $V_{CC} = 4.5$ V; see <a href="#">Figure 11</a>               | 12    | 6   | -   | ns   |
| $t_h$    | hold time Dn to LE            | $V_{CC} = 4.5$ V; see <a href="#">Figure 11</a>               | 4     | -1  | -   | ns   |
| $C_{PD}$ | power dissipation capacitance | per latch;<br>$V_I = \text{GND to } (V_{CC} - 1.5 \text{ V})$ | [1] - | 41  | -   | pF   |

$T_{amb} = -40$  °C to  $+85$  °C

|                          |                                                   |                                                 |    |   |    |    |
|--------------------------|---------------------------------------------------|-------------------------------------------------|----|---|----|----|
| $t_{PHL}$ ,<br>$t_{PLH}$ | propagation delay                                 |                                                 |    |   |    |    |
|                          | Dn to Qn                                          | $V_{CC} = 4.5$ V; see <a href="#">Figure 8</a>  | -  | - | 38 | ns |
|                          | LE to Qn                                          | $V_{CC} = 4.5$ V; see <a href="#">Figure 9</a>  | -  | - | 40 | ns |
| $t_{PZH}$ ,<br>$t_{PZL}$ | 3-state output enable time $\overline{OE}$ to Qn  | $V_{CC} = 4.5$ V; see <a href="#">Figure 10</a> | -  | - | 40 | ns |
| $t_{PHZ}$ ,<br>$t_{PLZ}$ | 3-state output disable time $\overline{OE}$ to Qn | $V_{CC} = 4.5$ V; see <a href="#">Figure 10</a> | -  | - | 38 | ns |
| $t_{THL}$ ,<br>$t_{TLH}$ | output transition time                            | $V_{CC} = 4.5$ V; see <a href="#">Figure 8</a>  | -  | - | 15 | ns |
| $t_W$                    | pulse width LE HIGH                               | $V_{CC} = 4.5$ V; see <a href="#">Figure 9</a>  | 20 | - | -  | ns |
| $t_{su}$                 | set-up time Dn to LE                              | $V_{CC} = 4.5$ V; see <a href="#">Figure 11</a> | 15 | - | -  | ns |
| $t_h$                    | hold time Dn to LE                                | $V_{CC} = 4.5$ V; see <a href="#">Figure 11</a> | 4  | - | -  | ns |

$T_{amb} = -40$  °C to  $+125$  °C

|                          |                                                   |                                                 |    |   |    |    |
|--------------------------|---------------------------------------------------|-------------------------------------------------|----|---|----|----|
| $t_{PHL}$ ,<br>$t_{PLH}$ | propagation delay                                 |                                                 |    |   |    |    |
|                          | Dn to Qn                                          | $V_{CC} = 4.5$ V; see <a href="#">Figure 8</a>  | -  | - | 45 | ns |
|                          | LE to Qn                                          | $V_{CC} = 4.5$ V; see <a href="#">Figure 9</a>  | -  | - | 48 | ns |
| $t_{PZH}$ ,<br>$t_{PZL}$ | 3-state output enable time $\overline{OE}$ to Qn  | $V_{CC} = 4.5$ V; see <a href="#">Figure 10</a> | -  | - | 48 | ns |
| $t_{PHZ}$ ,<br>$t_{PLZ}$ | 3-state output disable time $\overline{OE}$ to Qn | $V_{CC} = 4.5$ V; see <a href="#">Figure 10</a> | -  | - | 45 | ns |
| $t_{THL}$ ,<br>$t_{TLH}$ | output transition time                            | $V_{CC} = 4.5$ V; see <a href="#">Figure 8</a>  | -  | - | 18 | ns |
| $t_W$                    | pulse width LE HIGH                               | $V_{CC} = 4.5$ V; see <a href="#">Figure 8</a>  | 24 | - | -  | ns |
| $t_{su}$                 | set-up time Dn to LE                              | $V_{CC} = 4.5$ V; see <a href="#">Figure 11</a> | 18 | - | -  | ns |
| $t_h$                    | hold time Dn to LE                                | $V_{CC} = 4.5$ V; see <a href="#">Figure 11</a> | 4  | - | -  | ns |

[1]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

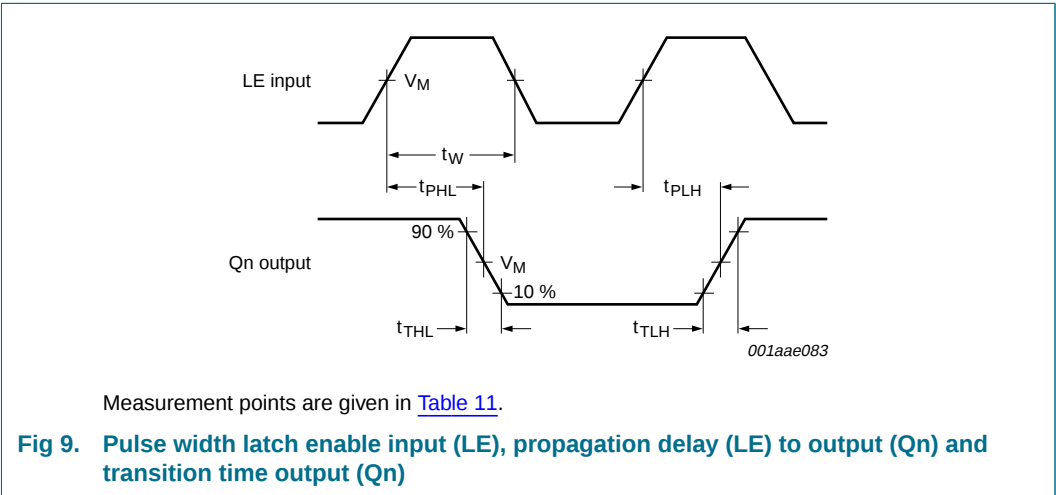
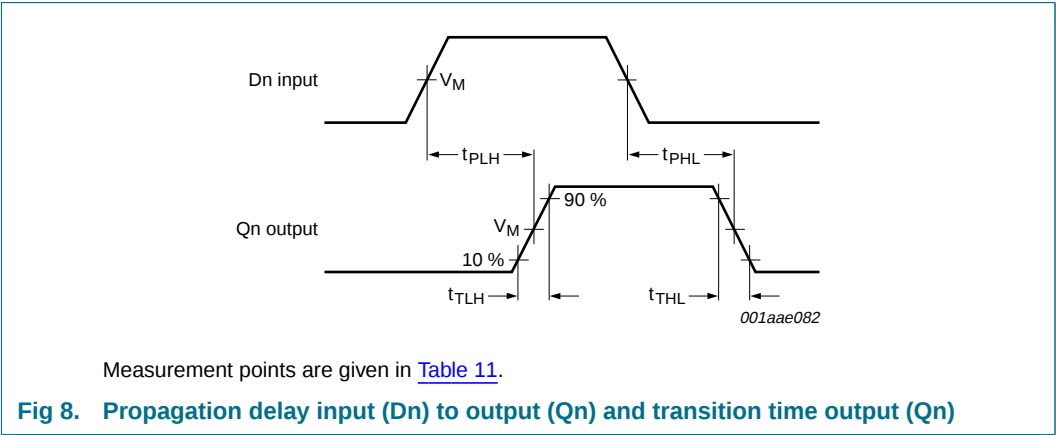
$C_L$  = output load capacitance in pF;

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

$N$  = number of inputs switching;

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

12. Waveforms



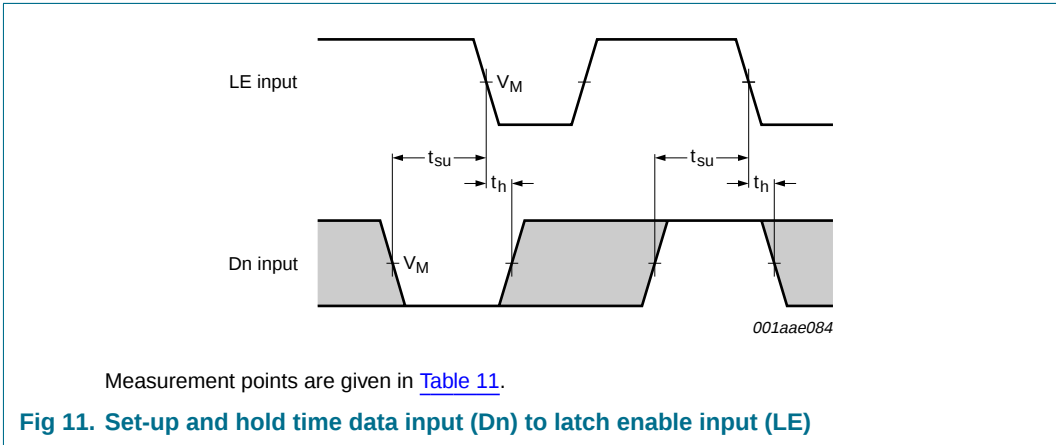
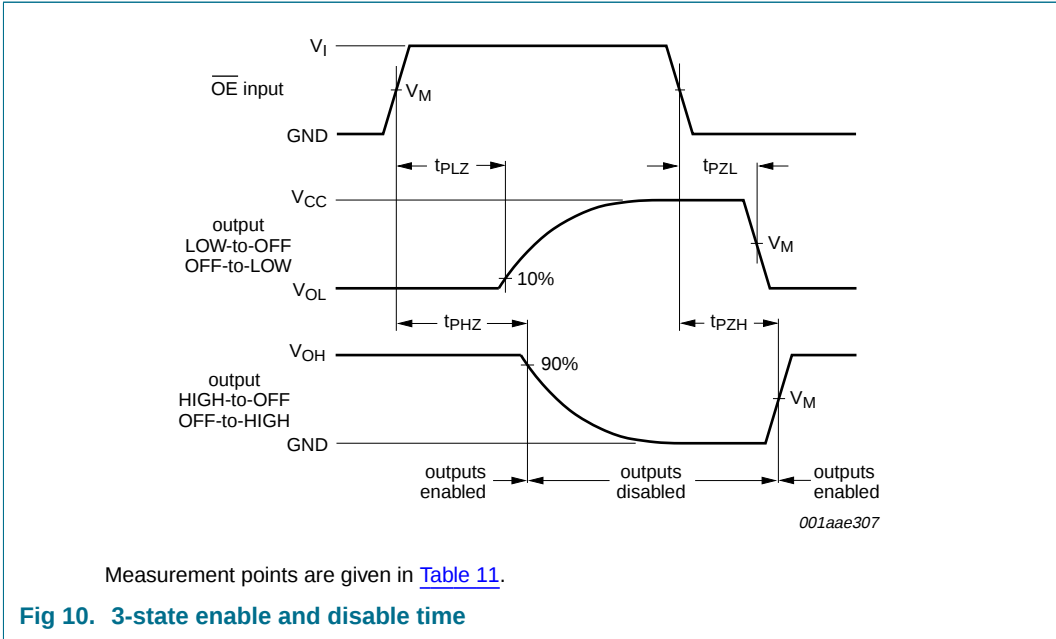


Table 11: Measurement points

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

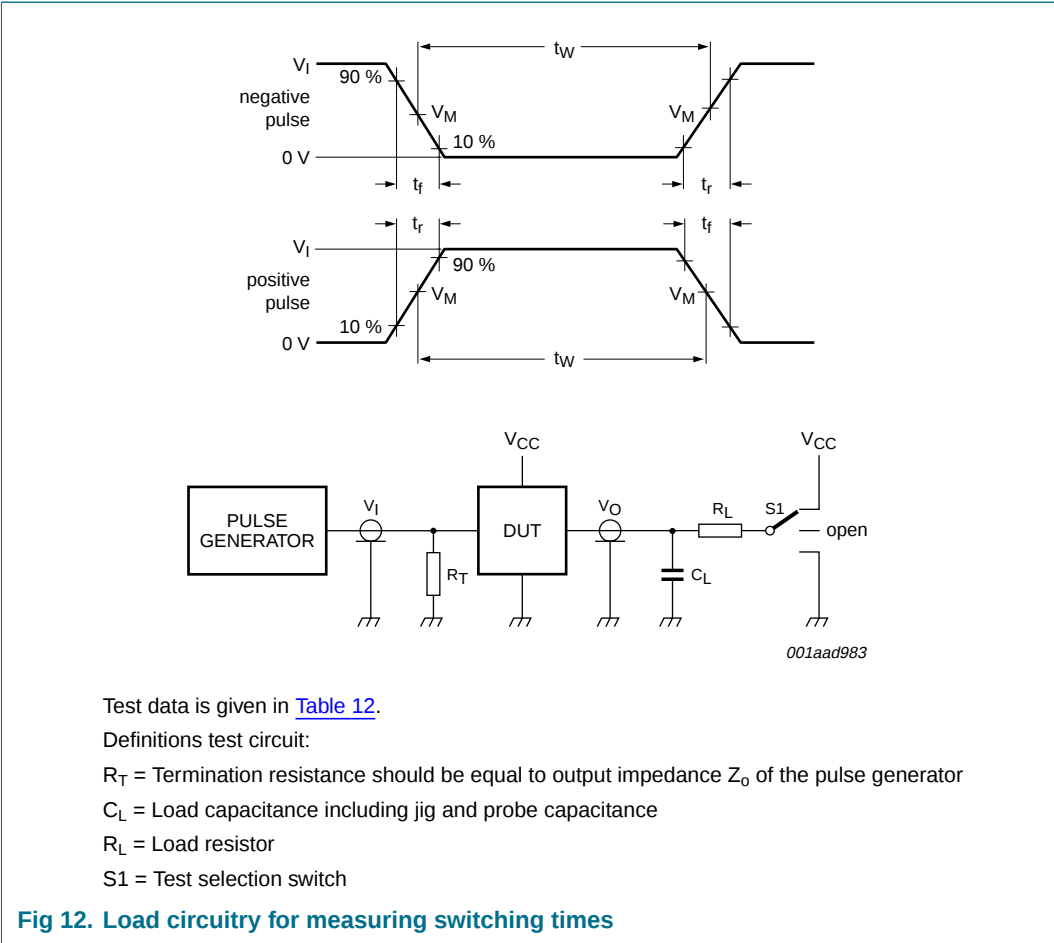


Fig 12. Load circuitry for measuring switching times

Table 12: 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                | $V_{CC}$           |

13. Package outline

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

SOT146-1

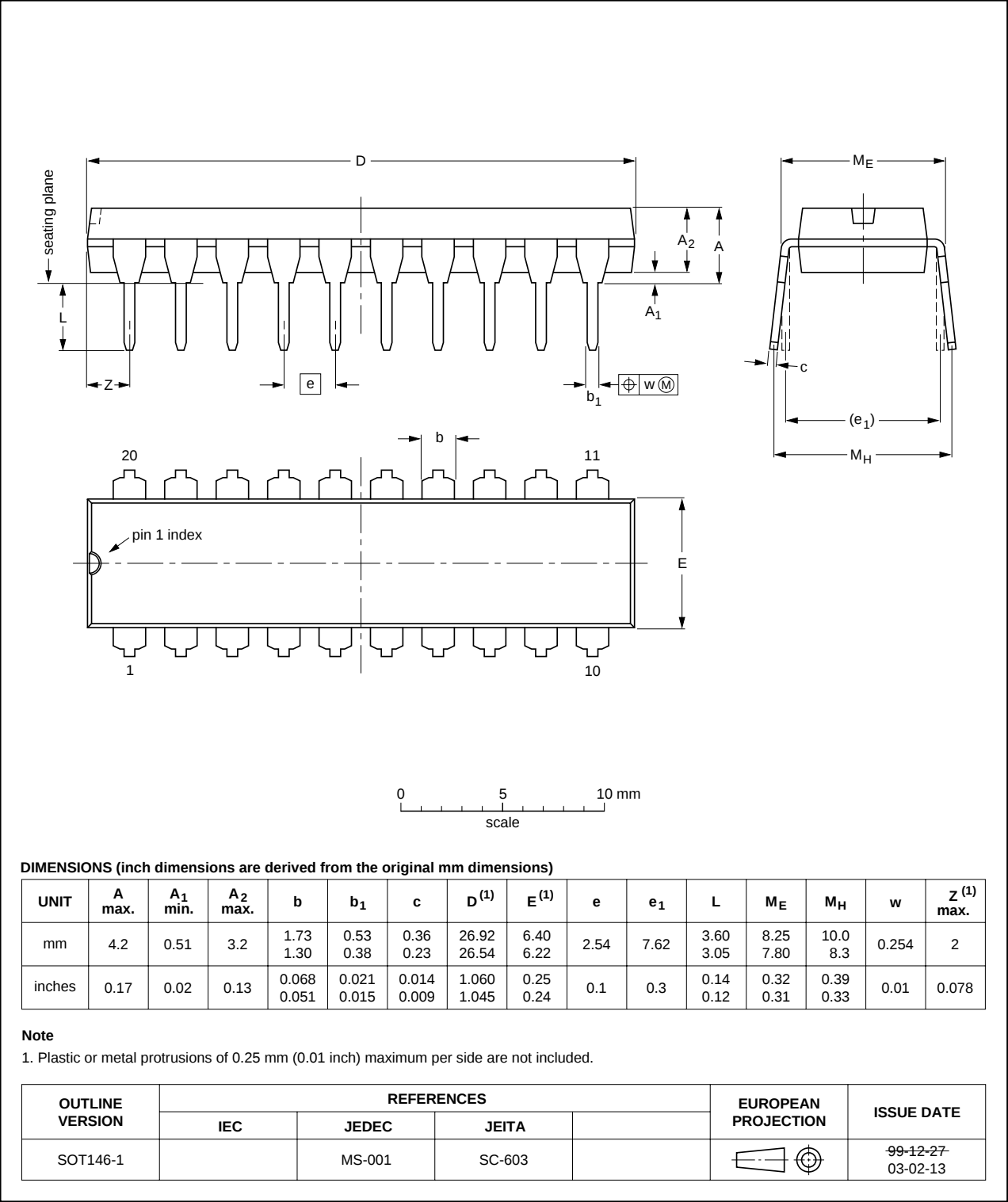
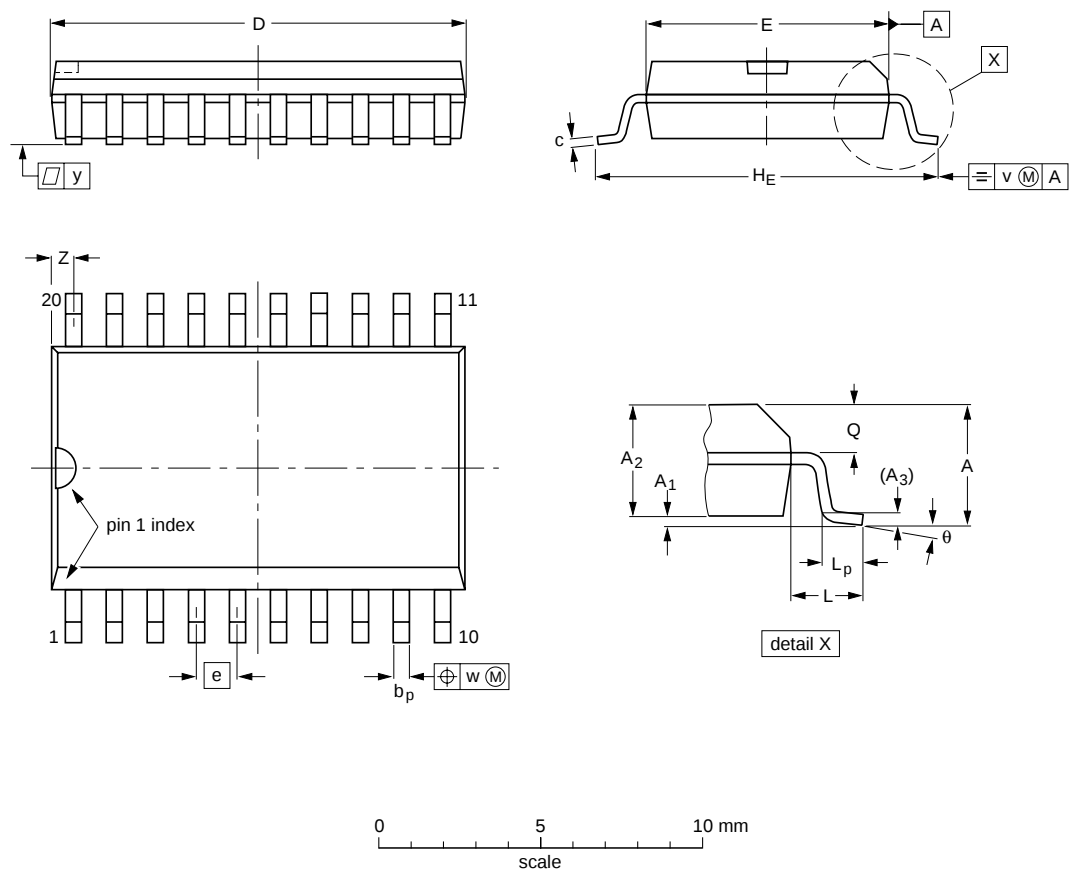


Fig 13. Package outline SOT146-1 (DIP20)

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

SOT163-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

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

Note

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

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

Fig 14. Package outline SOT163-1 (SO20)

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

SOT339-1

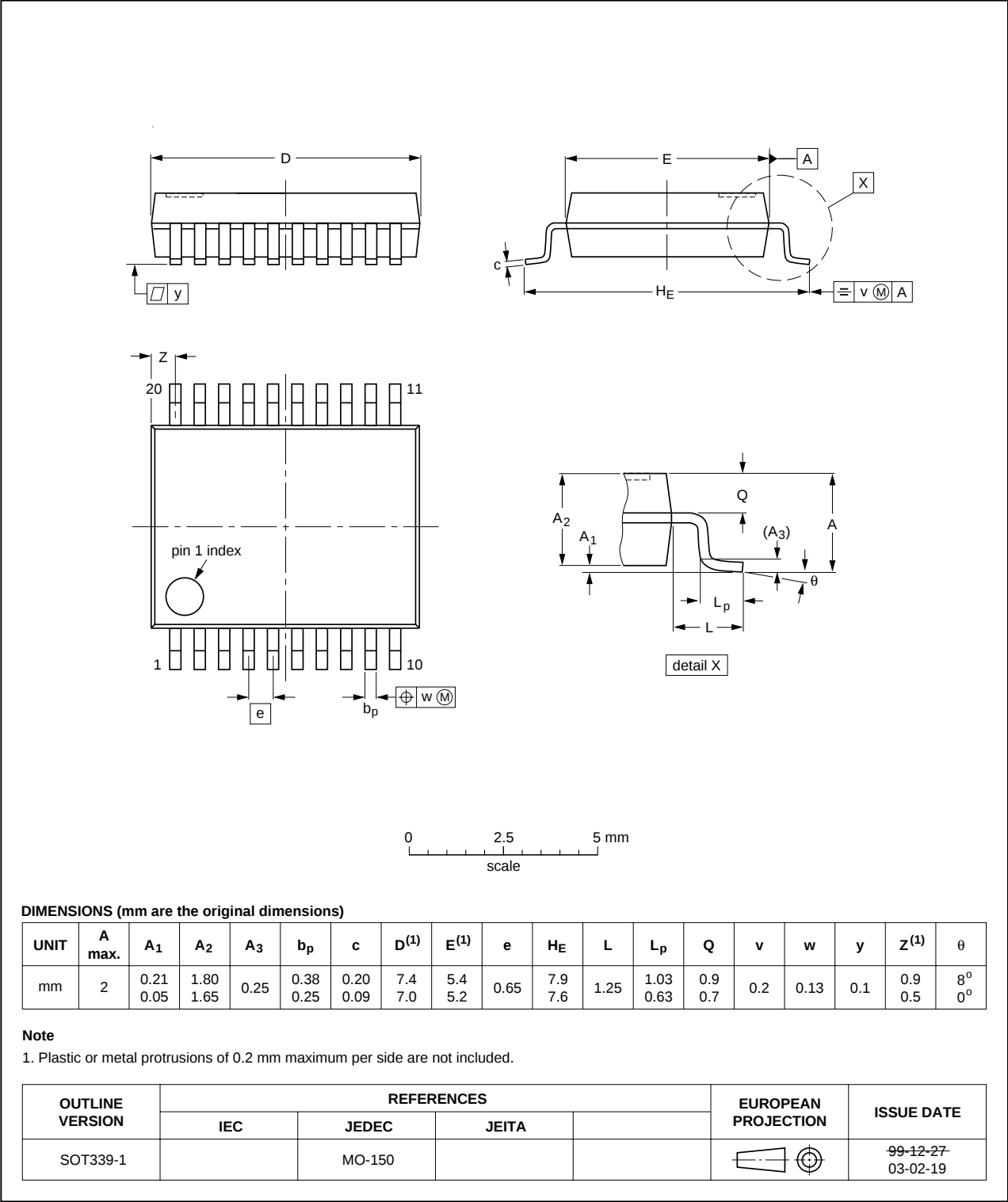


Fig 15. Package outline SOT339-1 (SSOP20)

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

SOT360-1

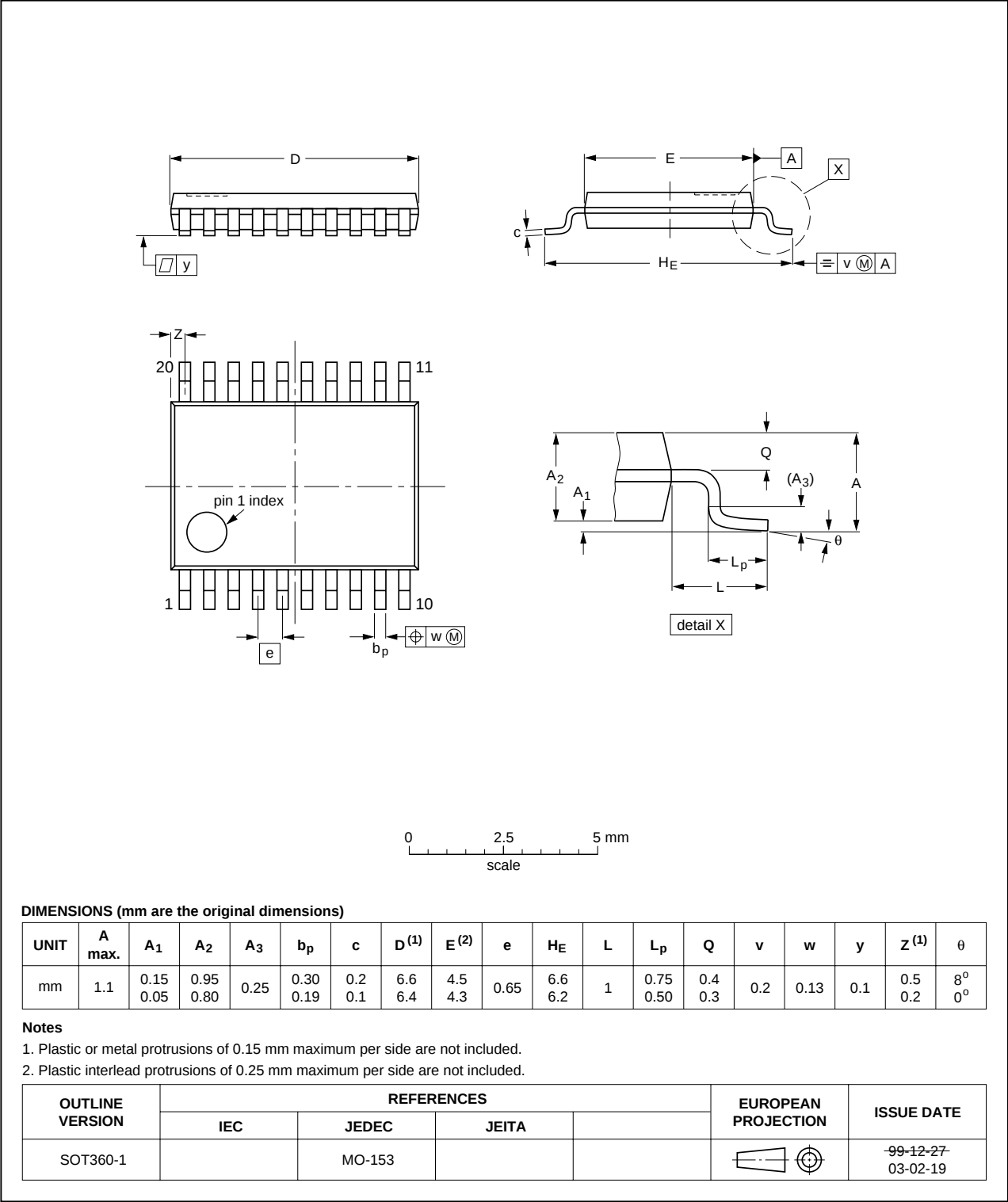


Fig 16. Package outline SOT360-1 (TSSOP20)

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

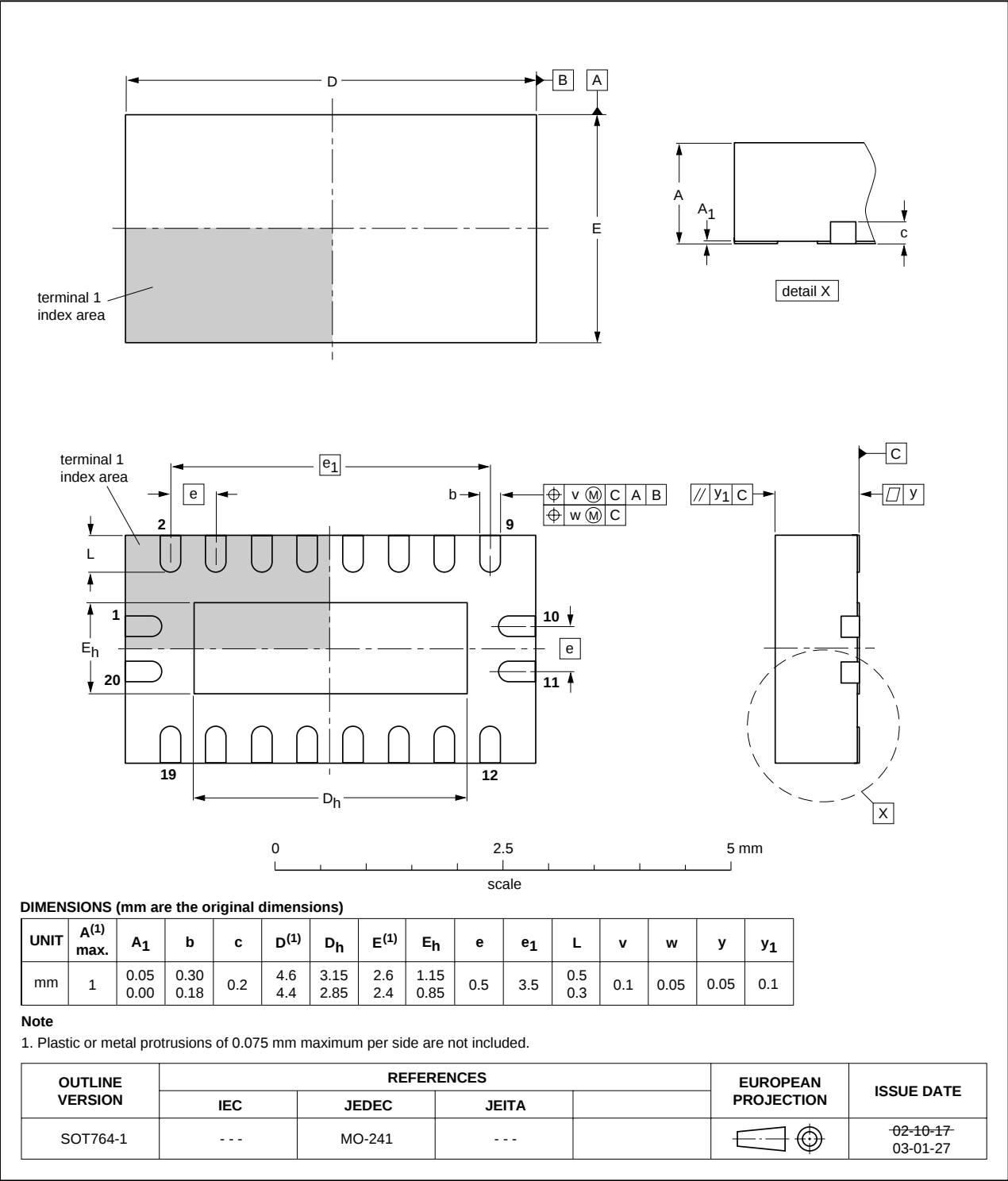


Fig 17. Package outline SOT764-1 (DHVQFN20)

## 14. Abbreviations

Table 13: Abbreviations

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

## 15. Revision history

Table 14: Revision history

| Document ID       | Release date                                                                                                                                                                                                                                                                                                                                   | Data sheet status     | Change notice | Doc. number | Supersedes        |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|-------------------|
| 74HC_HCT373_3     | 20060120                                                                                                                                                                                                                                                                                                                                       | Product data sheet    | -             | -           | 74HC_HCT373_CNV_2 |
| Modifications:    | <ul style="list-style-type: none"><li>• The format of this data sheet is redesigned to comply with the current presentation and information standard of Philips Semiconductors.</li><li>• Added type numbers 74HC373BQ and 74HCT373BQ (package DHVQFN20).</li><li>• Added family specifications.</li><li>• Added abbreviations list.</li></ul> |                       |               |             |                   |
| 74HC_HCT373_CNV_2 | 19970827                                                                                                                                                                                                                                                                                                                                       | Product specification | -             | -           | -                 |

## 16. Data sheet status

| Level | Data sheet status <sup>[1]</sup> | Product status <sup>[2] [3]</sup> | Definition                                                                                                                                                                                                                                                                                     |
|-------|----------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I     | Objective data                   | Development                       | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.                                                                                                    |
| II    | Preliminary data                 | Qualification                     | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.             |
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[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## 17. Definitions

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**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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