

# 74HC574-Q100; 74HCT574-Q100

Octal D-type flip-flop; positive edge-trigger; 3-state

Rev. 1 — 2 August 2012

Product data sheet

## 1. General description

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The 74HC574-Q100; 74HCT574-Q100 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 74HC574-Q100; 74HCT574-Q100 are octal D-type flip-flops featuring separate D-type inputs for each flip-flop and 3-state outputs for bus-oriented applications. A clock (CP) and an output enable ( $\overline{OE}$ ) input are common to all flip-flops. The 8 flip-flops store the state of their individual D-inputs that meet the set-up and hold times requirements on the LOW-to-HIGH CP transition. When  $\overline{OE}$  is LOW the contents of the 8 flip-flops 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 flip-flops.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

## 2. Features and benefits

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- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - ◆ 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-state non-inverting outputs for bus-oriented applications
- 8-bit positive, edge-triggered register
- Common 3-state output enable input
- ESD protection:
  - ◆ MIL-STD-883, method 3015 exceeds 2000 V
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V ( $C = 200\text{ pF}$ ,  $R = 0\text{ }\Omega$ )
- Multiple package options



3. Ordering information

Table 1. Ordering information

| Type number     | Package           |         |                                                                           |          |
|-----------------|-------------------|---------|---------------------------------------------------------------------------|----------|
|                 | Temperature range | Name    | Description                                                               | Version  |
| 74HC574D-Q100   | −40 °C to +125 °C | SO20    | plastic small outline package; 20 leads;<br>body width 7.5 mm             | SOT163-1 |
| 74HCT574D-Q100  |                   |         |                                                                           |          |
| 74HC574PW-Q100  | −40 °C to +125 °C | TSSOP20 | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm | SOT360-1 |
| 74HCT574PW-Q100 |                   |         |                                                                           |          |

4. Functional diagram

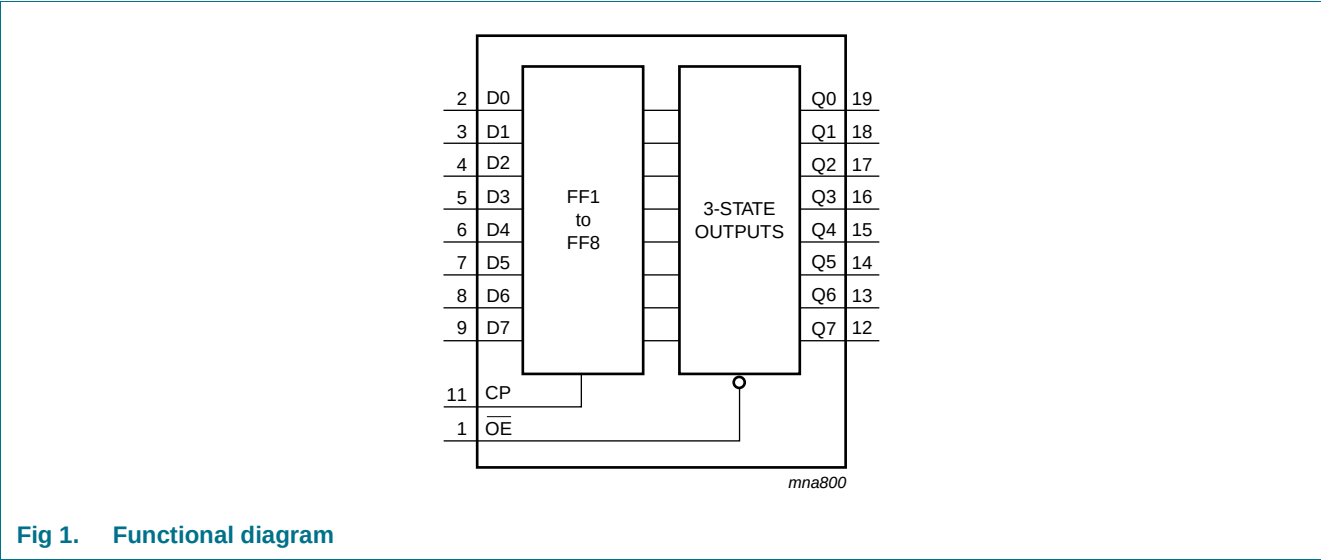


Fig 1. Functional diagram

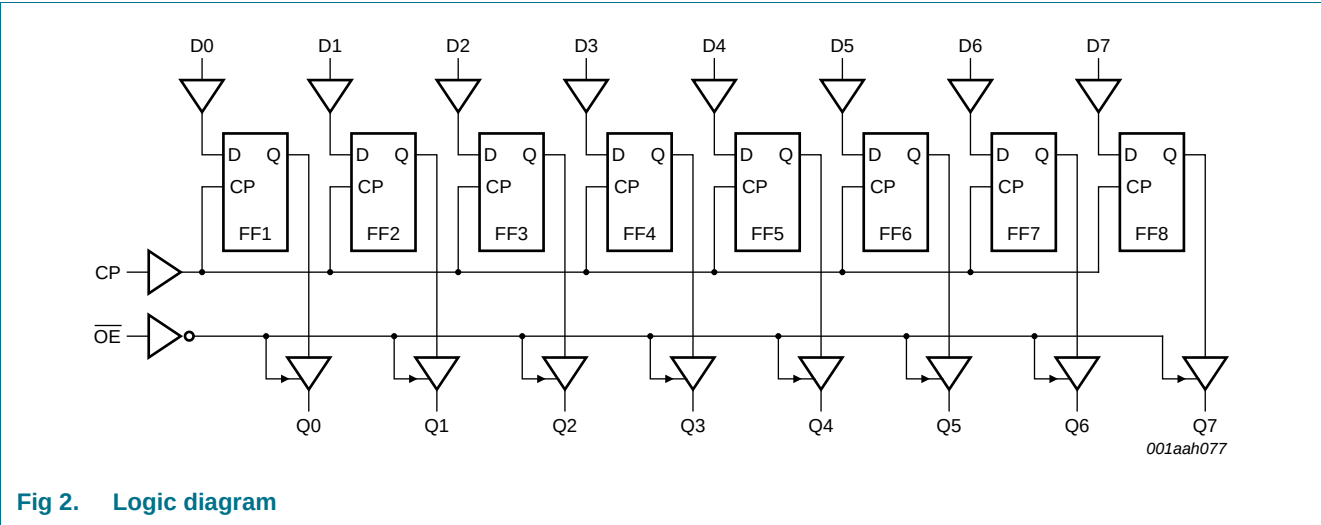
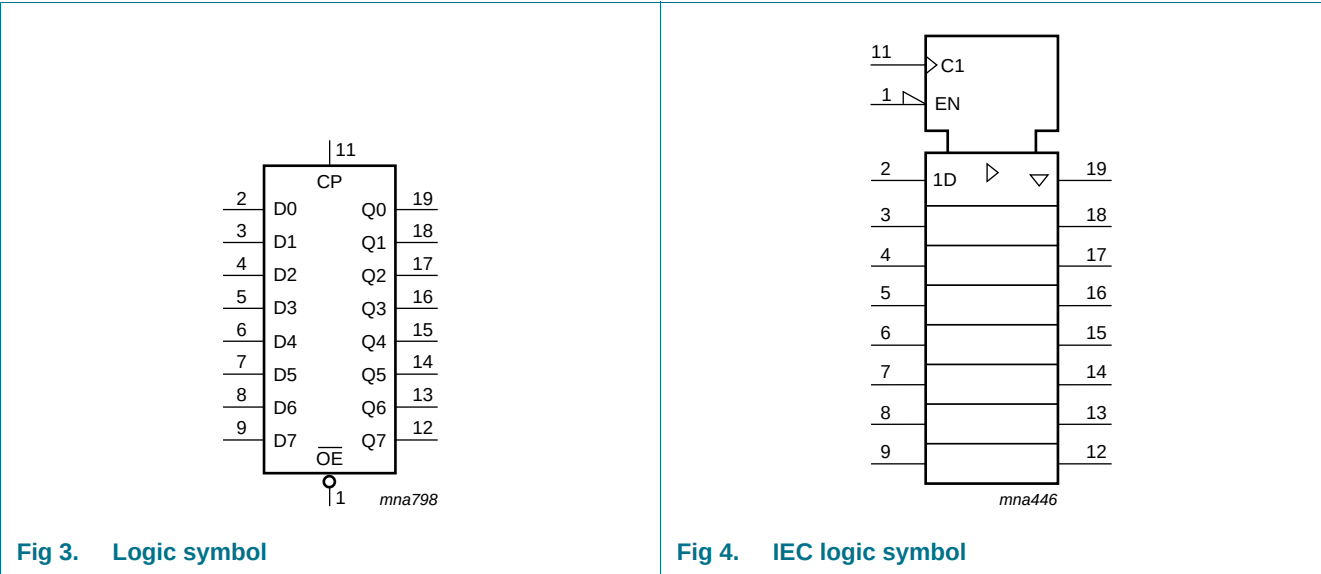
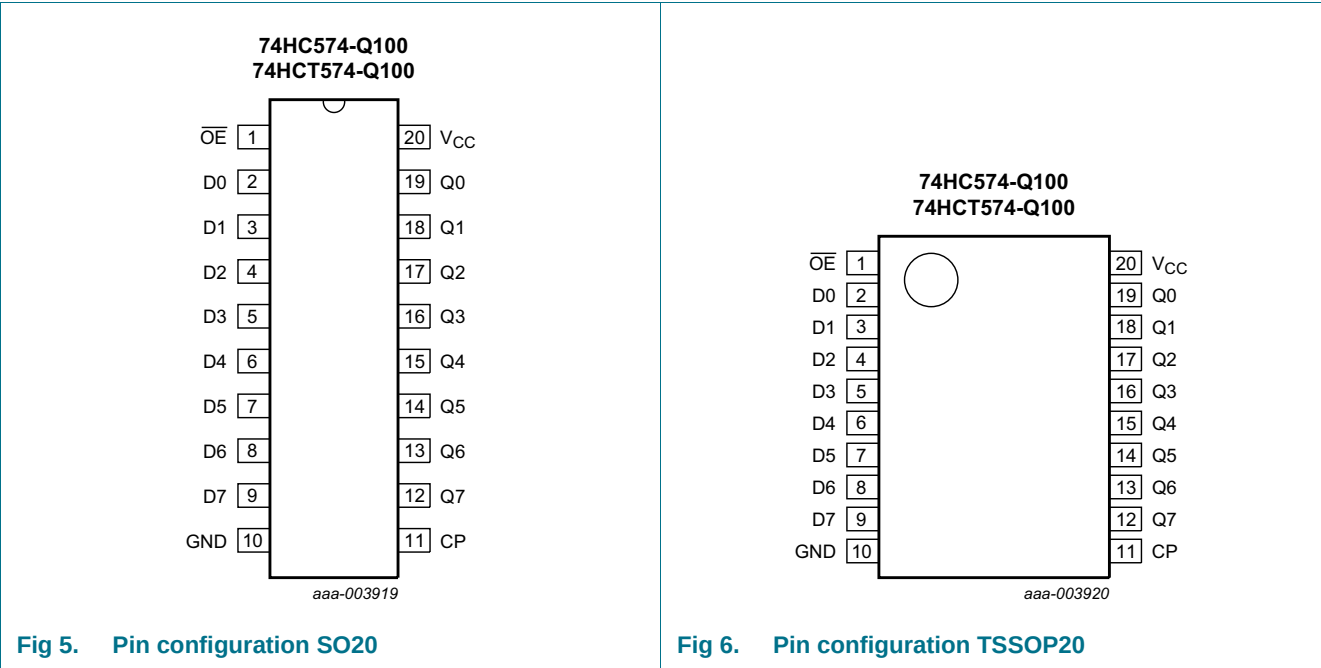


Fig 2. Logic diagram



## 5. Pinning information

### 5.1 Pinning



## 5.2 Pin description

**Table 2.** Pin description

| Symbol          | Pin                            | Description                               |
|-----------------|--------------------------------|-------------------------------------------|
| $\overline{OE}$ | 1                              | 3-state output enable input (active LOW)  |
| D[0:7]          | 2, 3, 4, 5, 6, 7, 8, 9         | data input                                |
| GND             | 10                             | ground (0 V)                              |
| CP              | 11                             | clock input (LOW-to-HIGH, edge triggered) |
| Q[0:7]          | 19, 18, 17, 16, 15, 14, 13, 12 | 3-state flip-flop output                  |
| V <sub>CC</sub> | 20                             | supply voltage                            |

## 6. Functional description

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

| Operating mode                   | Input |    |                | Internal flip-flop | Output Q <sub>n</sub> |
|----------------------------------|-------|----|----------------|--------------------|-----------------------|
|                                  | OE    | CP | D <sub>n</sub> |                    |                       |
| Load and read register           | L     | ↑  | l              | L                  | L                     |
|                                  | L     | ↑  | h              | H                  | H                     |
| Load register and disable output | H     | ↑  | l              | L                  | Z                     |
|                                  | H     | ↑  | h              | H                  | Z                     |

- [1] H = HIGH voltage level;  
 h = HIGH voltage level one setup time prior to the HIGH-to-LOW CP transition;  
 L = LOW voltage level;  
 l = LOW voltage level one setup time prior to the HIGH-to-LOW CP transition;  
 Z = high-impedance OFF-state;  
 ↑ = LOW-to-HIGH clock transition.

## 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 |                                                                     | <sup>[1]</sup> - | 500  | mW   |

- [1] For SO20 packages: P<sub>tot</sub> derates linearly with 8 mW/K above 70 °C.  
 For TSSOP20 packages: P<sub>tot</sub> derates linearly with 5.5 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              | 74HC574-Q100 |      |                 | 74HCT574-Q100 |      |                 | 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   |
| $\Delta t/\Delta V$ | 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**

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

| Symbol          | Parameter                 | Conditions                                                                                                                   | 25 °C |      |      | −40 °C to +85 °C |      | −40 °C to +125 °C |       | Unit |
|-----------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|-------|------|------|------------------|------|-------------------|-------|------|
|                 |                           |                                                                                                                              | Min   | Typ  | Max  | Min              | Max  | Min               | Max   |      |
| 74HC574-Q100    |                           |                                                                                                                              |       |      |      |                  |      |                   |       |      |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V                                                                                                      | 1.5   | 1.2  | -    | 1.5              | -    | 1.5               | -     | V    |
|                 |                           | V <sub>CC</sub> = 4.5 V                                                                                                      | 3.15  | 2.4  | -    | 3.15             | -    | 3.15              | -     | V    |
|                 |                           | V <sub>CC</sub> = 6.0 V                                                                                                      | 4.2   | 3.2  | -    | 4.2              | -    | 4.2               | -     | V    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V                                                                                                      | -     | 0.8  | 0.5  | -                | 0.5  | -                 | 0.5   | V    |
|                 |                           | V <sub>CC</sub> = 4.5 V                                                                                                      | -     | 2.1  | 1.35 | -                | 1.35 | -                 | 1.35  | V    |
|                 |                           | V <sub>CC</sub> = 6.0 V                                                                                                      | -     | 2.8  | 1.8  | -                | 1.8  | -                 | 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  | -    | 1.9              | -    | 1.9               | -     | V    |
|                 |                           | I <sub>O</sub> = −20 μA; V <sub>CC</sub> = 4.5 V                                                                             | 4.4   | 4.5  | -    | 4.4              | -    | 4.4               | -     | V    |
|                 |                           | I <sub>O</sub> = −20 μA; V <sub>CC</sub> = 6.0 V                                                                             | 5.9   | 6.0  | -    | 5.9              | -    | 5.9               | -     | V    |
|                 |                           | I <sub>O</sub> = −6.0 mA; V <sub>CC</sub> = 4.5 V                                                                            | 3.98  | 4.32 | -    | 3.84             | -    | 3.7               | -     | V    |
|                 |                           | I <sub>O</sub> = −7.8 mA; V <sub>CC</sub> = 6.0 V                                                                            | 5.48  | 5.81 | -    | 5.34             | -    | 5.2               | -     | 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  | -                | 0.1  | -                 | 0.1   | V    |
|                 |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V                                                                              | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1   | V    |
|                 |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 V                                                                              | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1   | V    |
|                 |                           | I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V                                                                             | -     | 0.15 | 0.26 | -                | 0.33 | -                 | 0.4   | V    |
|                 |                           | I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V                                                                             | -     | 0.16 | 0.26 | -                | 0.33 | -                 | 0.4   | V    |
| I <sub>I</sub>  | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 6.0 V                                                          | -     | -    | ±0.1 | -                | ±1.0 | -                 | ±1.0  | μA   |
| I <sub>OZ</sub> | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>O</sub> = V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 6.0 V | -     | -    | ±0.5 | -                | ±5.0 | -                 | ±10.0 | μA   |

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

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

| Symbol               | Parameter                 | Conditions                                                                                                                             | 25 °C |      |           | –40 °C to +85 °C |           | –40 °C to +125 °C |           | Unit    |
|----------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------|------|-----------|------------------|-----------|-------------------|-----------|---------|
|                      |                           |                                                                                                                                        | Min   | Typ  | Max       | Min              | Max       | Min               | Max       |         |
| $I_{CC}$             | supply current            | $V_I = V_{CC}$ or GND; $I_O = 0$ A;<br>$V_{CC} = 6.0$ V                                                                                | -     | -    | 8.0       | -                | 80        | -                 | 160       | $\mu$ A |
| $C_I$                | input capacitance         |                                                                                                                                        | -     | 3.5  | -         |                  |           |                   |           | pF      |
| <b>74HCT574-Q100</b> |                           |                                                                                                                                        |       |      |           |                  |           |                   |           |         |
| $V_{IH}$             | HIGH-level input voltage  | $V_{CC} = 4.5$ V to 5.5 V                                                                                                              | 2.0   | 1.6  | -         | 2.0              | -         | 2.0               | -         | V       |
| $V_{IL}$             | LOW-level input voltage   | $V_{CC} = 4.5$ V to 5.5 V                                                                                                              | -     | 1.2  | 0.8       | -                | 0.8       | -                 | 0.8       | V       |
| $V_{OH}$             | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5$ V                                                                                          |       |      |           |                  |           |                   |           |         |
|                      |                           | $I_O = -20$ $\mu$ A                                                                                                                    | 4.4   | 4.5  | -         | 4.4              | -         | 4.4               | -         | V       |
|                      |                           | $I_O = -6$ mA                                                                                                                          | 3.98  | 4.32 | -         | 3.84             | -         | 3.7               | -         | V       |
| $V_{OL}$             | LOW-level output voltage  | $V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5$ V                                                                                          |       |      |           |                  |           |                   |           |         |
|                      |                           | $I_O = 20$ $\mu$ A                                                                                                                     | -     | 0    | 0.1       | -                | 0.1       | -                 | 0.1       | V       |
|                      |                           | $I_O = 6.0$ mA                                                                                                                         | -     | 0.16 | 0.26      | -                | 0.33      | -                 | 0.4       | V       |
| $I_I$                | input leakage current     | $V_I = V_{CC}$ or GND;<br>$V_{CC} = 5.5$ V                                                                                             | -     | -    | $\pm 0.1$ | -                | $\pm 1.0$ | -                 | $\pm 1.0$ | $\mu$ A |
| $I_{OZ}$             | OFF-state output current  | $V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 5.5$ V;<br>$V_O = V_{CC}$ or GND per input pin;<br>other inputs at $V_{CC}$ or GND; $I_O = 0$ A | -     | -    | $\pm 0.5$ | -                | $\pm 5.0$ | -                 | $\pm 10$  | $\mu$ A |
| $I_{CC}$             | supply current            | $V_I = V_{CC}$ or GND; $I_O = 0$ A;<br>$V_{CC} = 5.5$ V                                                                                | -     | -    | 8.0       | -                | 80        | -                 | 160       | $\mu$ A |
| $\Delta I_{CC}$      | additional supply current | $V_I = V_{CC} - 2.1$ V;<br>other inputs at $V_{CC}$ or GND;<br>$V_{CC} = 4.5$ V to 5.5 V;<br>$I_O = 0$ A                               |       |      |           |                  |           |                   |           |         |
|                      |                           | per input pin; Dn inputs                                                                                                               | -     | 50   | 180       | -                | 225       | -                 | 245       | $\mu$ A |
|                      |                           | per input pin; $\overline{OE}$ input                                                                                                   | -     | 125  | 450       | -                | 563       | -                 | 613       | $\mu$ A |
|                      |                           | per input pin; CP input                                                                                                                | -     | 150  | 540       | -                | 675       | -                 | 735       | $\mu$ A |
| $C_I$                | input capacitance         |                                                                                                                                        | -     | 3.5  | -         |                  |           |                   |           | pF      |

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 10](#).

| Symbol                | Parameter         | Conditions                                                              | 25 °C |     |     | –40 °C to +85 °C |     | –40 °C to +125 °C |     | Unit |
|-----------------------|-------------------|-------------------------------------------------------------------------|-------|-----|-----|------------------|-----|-------------------|-----|------|
|                       |                   |                                                                         | Min   | Typ | Max | Min              | Max | Min               | Max |      |
| For type 74HC574-Q100 |                   |                                                                         |       |     |     |                  |     |                   |     |      |
| t <sub>pd</sub>       | propagation delay | CP to Qn; see <a href="#">Figure 7</a> <a href="#">[1]</a>              |       |     |     |                  |     |                   |     |      |
|                       |                   | V <sub>CC</sub> = 2.0 V                                                 | -     | 47  | 150 | -                | 190 | -                 | 225 | ns   |
|                       |                   | V <sub>CC</sub> = 4.5 V                                                 | -     | 17  | 30  | -                | 35  | -                 | 45  | ns   |
|                       |                   | V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF                           | -     | 14  | -   | -                | -   | -                 | -   | ns   |
|                       |                   | V <sub>CC</sub> = 6.0 V                                                 | -     | 14  | 26  | -                | 33  | -                 | 38  | ns   |
| t <sub>en</sub>       | enable time       | $\overline{OE}$ to Qn; see <a href="#">Figure 9</a> <a href="#">[2]</a> |       |     |     |                  |     |                   |     |      |
|                       |                   | V <sub>CC</sub> = 2.0 V                                                 | -     | 44  | 140 | -                | 175 | -                 | 210 | ns   |
|                       |                   | V <sub>CC</sub> = 4.5 V                                                 | -     | 16  | 28  | -                | 35  | -                 | 42  | ns   |
|                       |                   | V <sub>CC</sub> = 6.0 V                                                 | -     | 13  | 24  | -                | 30  | -                 | 36  | ns   |
|                       |                   |                                                                         |       |     |     |                  |     |                   |     |      |
| t <sub>dis</sub>      | disable time      | $\overline{OE}$ to Qn; see <a href="#">Figure 9</a> <a href="#">[3]</a> |       |     |     |                  |     |                   |     |      |
|                       |                   | V <sub>CC</sub> = 2.0 V                                                 | -     | 39  | 125 | -                | 155 | -                 | 190 | ns   |
|                       |                   | V <sub>CC</sub> = 4.5 V                                                 | -     | 14  | 25  | -                | 31  | -                 | 38  | ns   |
|                       |                   | V <sub>CC</sub> = 6.0 V                                                 | -     | 11  | 21  | -                | 26  | -                 | 32  | ns   |
|                       |                   |                                                                         |       |     |     |                  |     |                   |     |      |
| t <sub>t</sub>        | transition time   | Qn; see <a href="#">Figure 7</a> <a href="#">[4]</a>                    |       |     |     |                  |     |                   |     |      |
|                       |                   | V <sub>CC</sub> = 2.0 V                                                 | -     | 14  | 60  | -                | 75  | -                 | 90  | ns   |
|                       |                   | V <sub>CC</sub> = 4.5 V                                                 | -     | 5   | 12  | -                | 15  | -                 | 18  | ns   |
|                       |                   | V <sub>CC</sub> = 6.0 V                                                 | -     | 4   | 10  | -                | 13  | -                 | 15  | ns   |
|                       |                   |                                                                         |       |     |     |                  |     |                   |     |      |
| t <sub>w</sub>        | pulse width       | CP HIGH or LOW; see <a href="#">Figure 8</a>                            |       |     |     |                  |     |                   |     |      |
|                       |                   | V <sub>CC</sub> = 2.0 V                                                 | 80    | 14  | -   | 100              | -   | 120               | -   | ns   |
|                       |                   | V <sub>CC</sub> = 4.5 V                                                 | 16    | 5   | -   | 20               | -   | 24                | -   | ns   |
|                       |                   | V <sub>CC</sub> = 6.0 V                                                 | 14    | 4   | -   | 17               | -   | 20                | -   | ns   |
|                       |                   |                                                                         |       |     |     |                  |     |                   |     |      |
| t <sub>su</sub>       | set-up time       | Dn to CP; see <a href="#">Figure 8</a>                                  |       |     |     |                  |     |                   |     |      |
|                       |                   | V <sub>CC</sub> = 2.0 V                                                 | 60    | 6   | -   | 75               | -   | 90                | -   | ns   |
|                       |                   | V <sub>CC</sub> = 4.5 V                                                 | 12    | 2   | -   | 15               | -   | 18                | -   | ns   |
|                       |                   | V <sub>CC</sub> = 6.0 V                                                 | 10    | 2   | -   | 13               | -   | 15                | -   | ns   |
|                       |                   |                                                                         |       |     |     |                  |     |                   |     |      |
| t <sub>h</sub>        | hold time         | Dn to CP; see <a href="#">Figure 8</a>                                  |       |     |     |                  |     |                   |     |      |
|                       |                   | V <sub>CC</sub> = 2.0 V                                                 | 5     | 0   | -   | 5                | -   | 5                 | -   | ns   |
|                       |                   | V <sub>CC</sub> = 4.5 V                                                 | 5     | 0   | -   | 5                | -   | 5                 | -   | ns   |
|                       |                   | V <sub>CC</sub> = 6.0 V                                                 | 5     | 0   | -   | 5                | -   | 5                 | -   | ns   |
|                       |                   |                                                                         |       |     |     |                  |     |                   |     |      |
| f <sub>max</sub>      | maximum frequency | CP; see <a href="#">Figure 7</a>                                        |       |     |     |                  |     |                   |     |      |
|                       |                   | V <sub>CC</sub> = 2.0 V                                                 | 6.0   | 37  | -   | 4.8              | -   | 4.0               | -   | MHz  |
|                       |                   | V <sub>CC</sub> = 4.5 V                                                 | 30    | 112 | -   | 24               | -   | 20                | -   | MHz  |
|                       |                   | V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF                           | -     | 123 | -   | -                | -   | -                 | -   | MHz  |
|                       |                   | V <sub>CC</sub> = 6.0 V                                                 | 35    | 133 | -   | 28               | -   | 24                | -   | MHz  |

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

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 10](#).

| Symbol                        | Parameter                     | Conditions                                                   | 25 °C |     |     | –40 °C to +85 °C |     | –40 °C to +125 °C |     | Unit |
|-------------------------------|-------------------------------|--------------------------------------------------------------|-------|-----|-----|------------------|-----|-------------------|-----|------|
|                               |                               |                                                              | Min   | Typ | Max | Min              | Max | Min               | Max |      |
| $C_{PD}$                      | power dissipation capacitance | $C_L = 50$ pF; $f = 1$ MHz;<br>$V_I = \text{GND to } V_{CC}$ | [5]   | -   | 22  | -                | -   | -                 | -   | pF   |
| <b>For type 74HCT574-Q100</b> |                               |                                                              |       |     |     |                  |     |                   |     |      |
| $t_{pd}$                      | propagation delay             | CP to Qn; see <a href="#">Figure 7</a>                       | [1]   |     |     |                  |     |                   |     |      |
|                               |                               | $V_{CC} = 4.5$ V                                             | -     | 18  | 33  | -                | 41  | -                 | 50  | ns   |
|                               |                               | $V_{CC} = 5$ V; $C_L = 15$ pF                                | -     | 15  | -   | -                | -   | -                 | -   | ns   |
| $t_{en}$                      | enable time                   | OE to Qn; see <a href="#">Figure 9</a>                       | [2]   |     |     |                  |     |                   |     |      |
|                               |                               | $V_{CC} = 4.5$ V                                             | -     | 19  | 33  | -                | 41  | -                 | 50  | ns   |
| $t_{dis}$                     | disable time                  | OE to Qn; see <a href="#">Figure 9</a>                       | [3]   |     |     |                  |     |                   |     |      |
|                               |                               | $V_{CC} = 4.5$ V                                             | -     | 16  | 28  | -                | 35  | -                 | 42  | ns   |
| $t_t$                         | transition time               | Qn; see <a href="#">Figure 7</a>                             | [4]   |     |     |                  |     |                   |     |      |
|                               |                               | $V_{CC} = 4.5$ V                                             | -     | 5   | 12  | -                | 15  | -                 | 18  | ns   |
| $t_W$                         | pulse width                   | CP HIGH or LOW;<br>see <a href="#">Figure 8</a>              |       |     |     |                  |     |                   |     |      |
|                               |                               | $V_{CC} = 4.5$ V                                             | 16    | 7   | -   | 20               | -   | 24                | -   | ns   |
| $t_{su}$                      | set-up time                   | Dn to CP; see <a href="#">Figure 8</a>                       |       |     |     |                  |     |                   |     |      |
|                               |                               | $V_{CC} = 4.5$ V                                             | 12    | 3   | -   | 15               | -   | 18                | -   | ns   |
| $t_h$                         | hold time                     | Dn to CP; see <a href="#">Figure 8</a>                       |       |     |     |                  |     |                   |     |      |
|                               |                               | $V_{CC} = 4.5$ V                                             | 5     | -1  | -   | 5                | -   | 5                 | -   | ns   |
| $f_{max}$                     | maximum frequency             | CP; see <a href="#">Figure 7</a>                             |       |     |     |                  |     |                   |     |      |
|                               |                               | $V_{CC} = 4.5$ V                                             | 30    | 69  | -   | 24               | -   | 20                | -   | MHz  |
|                               |                               | $V_{CC} = 5$ V; $C_L = 15$ pF                                | -     | 76  | -   | -                | -   | -                 | -   | MHz  |
| $C_{PD}$                      | power dissipation capacitance | $C_L = 50$ pF; $f = 1$ MHz;<br>$V_I = \text{GND to } V_{CC}$ | [5]   | -   | 25  | -                | -   | -                 | -   | pF   |

[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  $\mu\text{W}$ ).

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

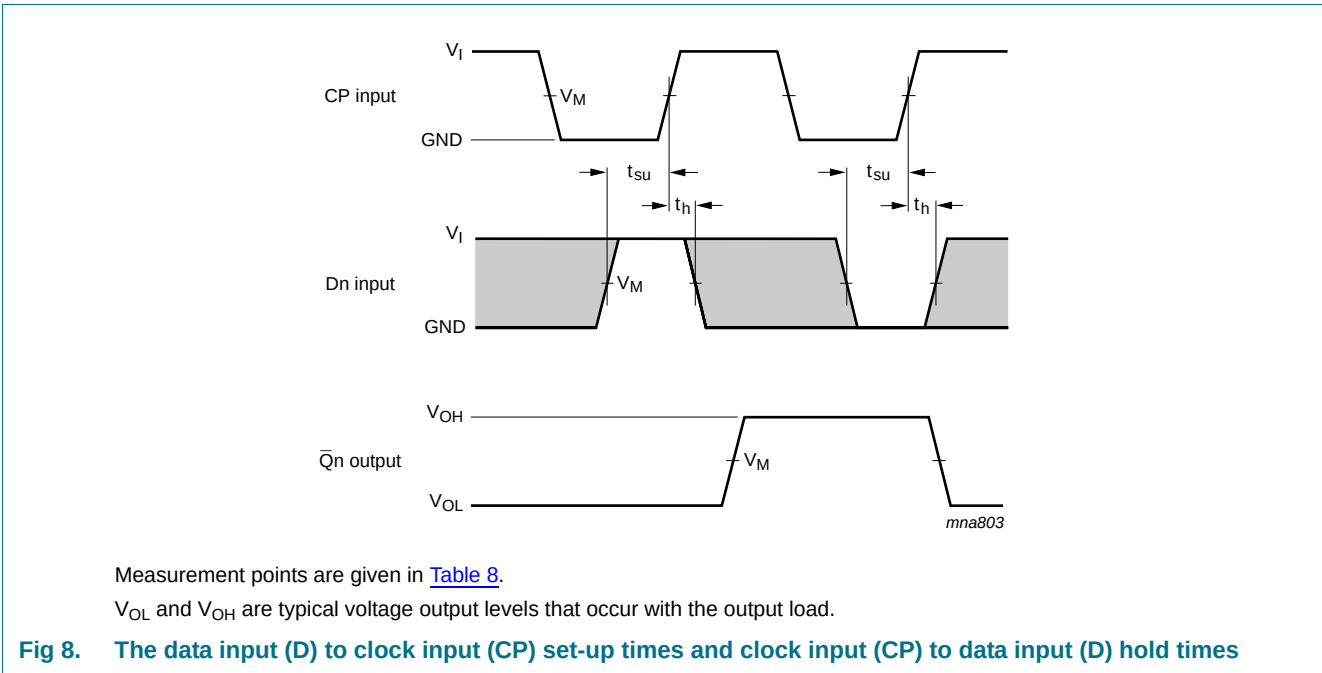
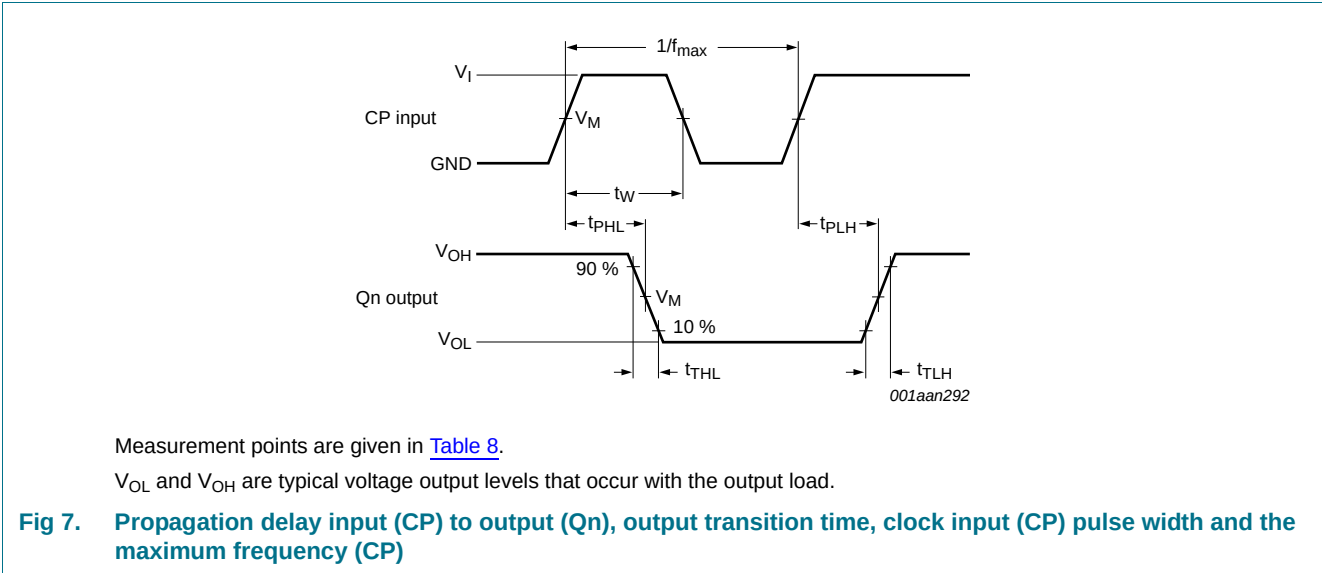
$V_{CC}$  = supply voltage in V;

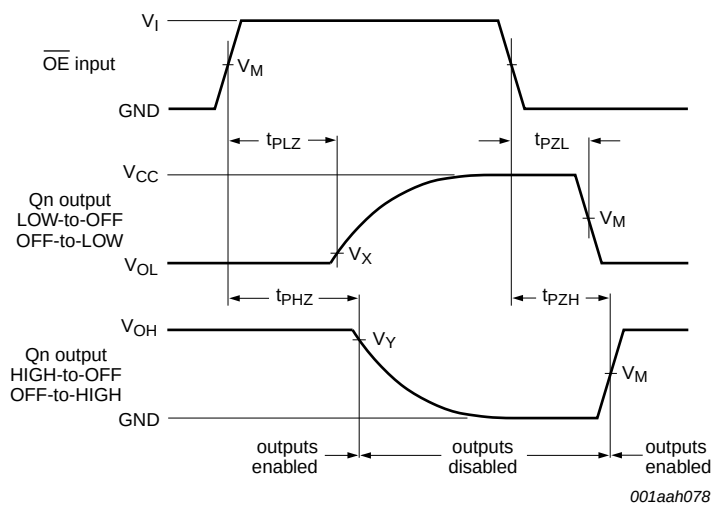
$N$  = number of inputs switching;

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



11. Waveforms





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

Fig 9. Enable and disable times

Table 8. Measurement points

| Type          | Input       | Output      |             |             |
|---------------|-------------|-------------|-------------|-------------|
|               | $V_M$       | $V_M$       | $V_X$       | $V_Y$       |
| 74HC574-Q100  | $0.5V_{CC}$ | $0.5V_{CC}$ | $0.1V_{CC}$ | $0.9V_{CC}$ |
| 74HCT574-Q100 | 1.3 V       | 1.3 V       | $0.1V_{CC}$ | $0.9V_{CC}$ |

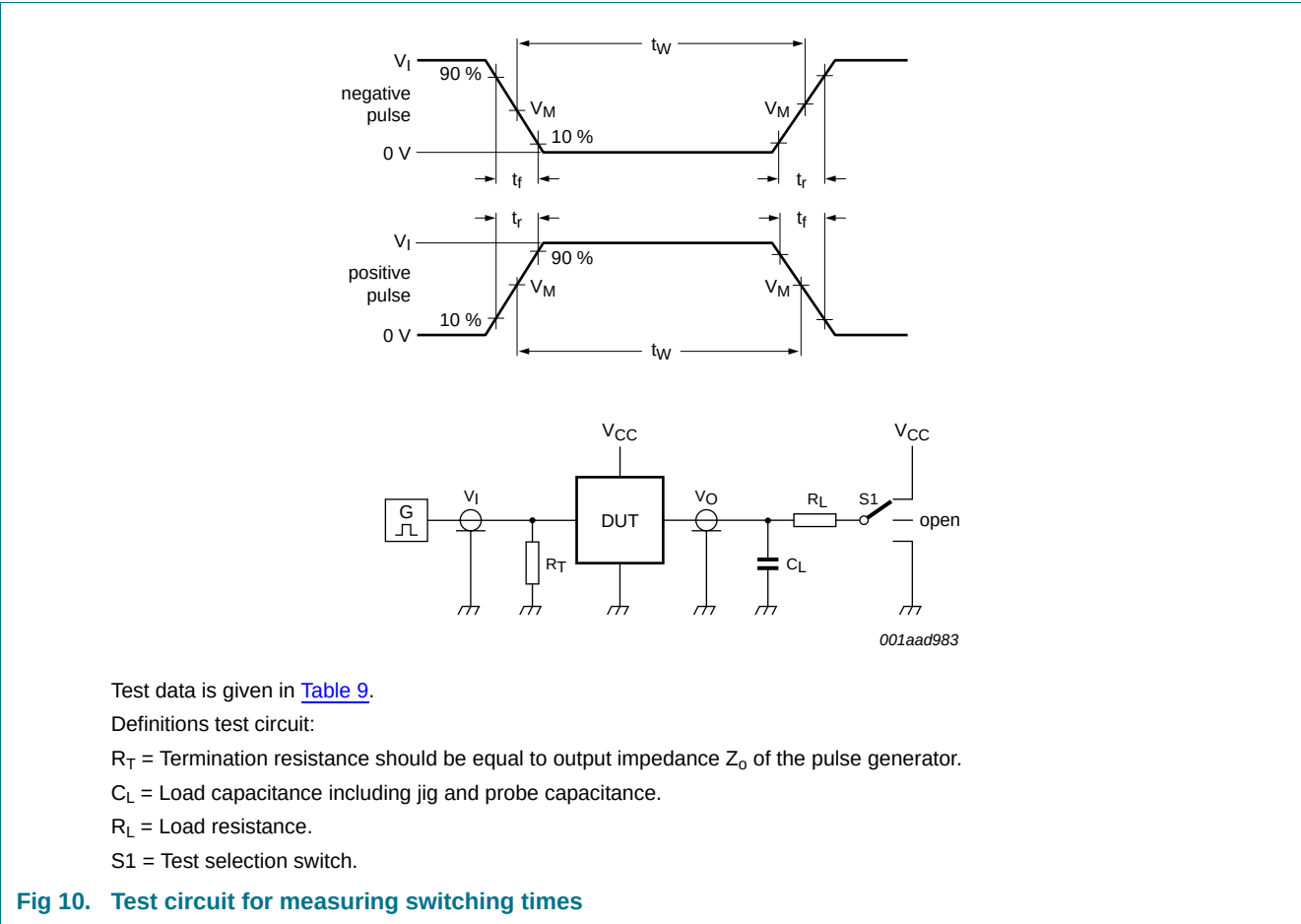


Table 9. Test data

| Type          | Input    |            | Load         |              | S1 position        |                    |                    |
|---------------|----------|------------|--------------|--------------|--------------------|--------------------|--------------------|
|               | $V_I$    | $t_r, t_f$ | $C_L$        | $R_L$        | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 74HC574-Q100  | $V_{CC}$ | 6 ns       | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |
| 74HCT574-Q100 | 3 V      | 6 ns       | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |

12. Package outline

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

SOT163-1

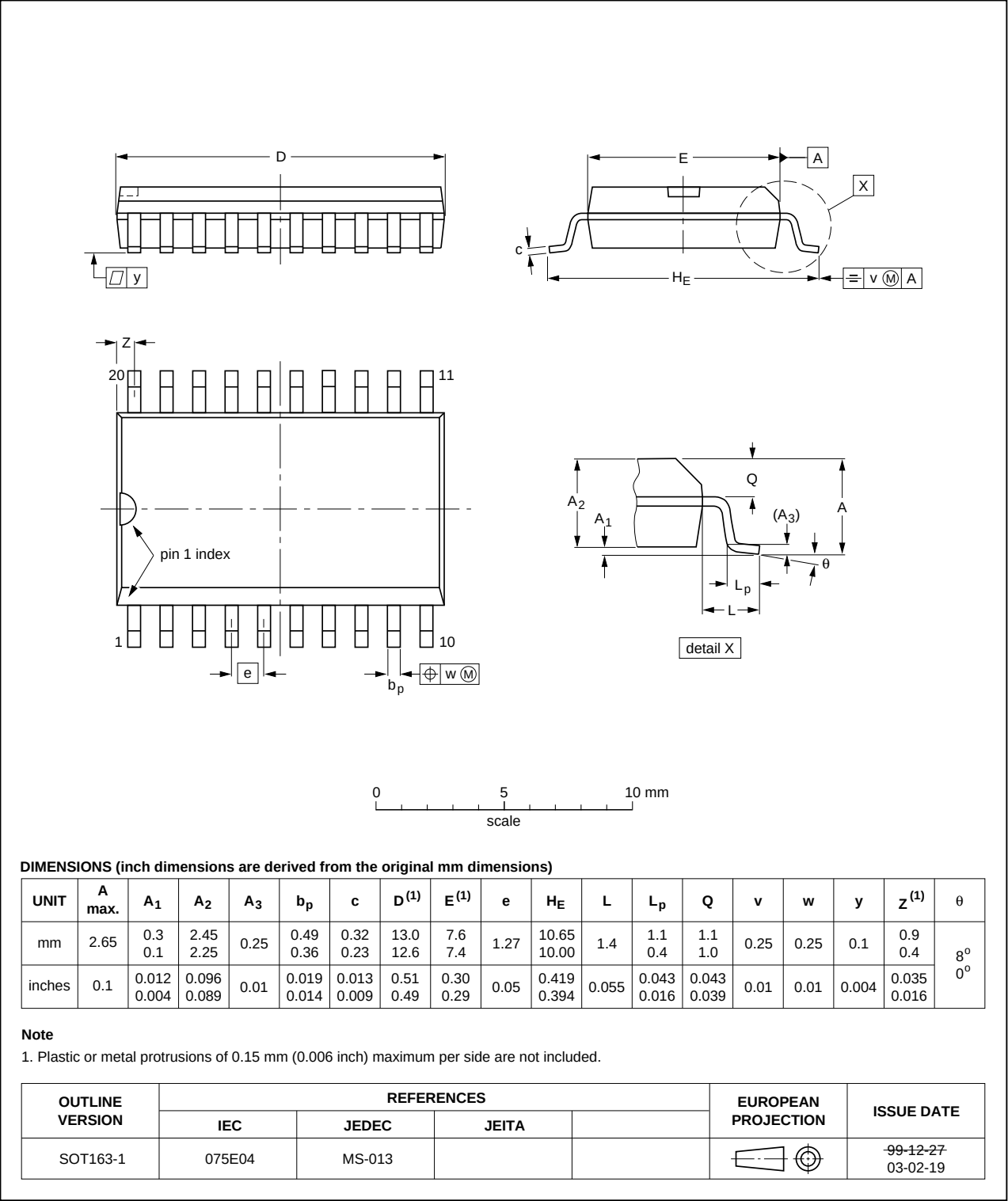


Fig 11. Package outline SOT163-1 (SO20)

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

SOT360-1

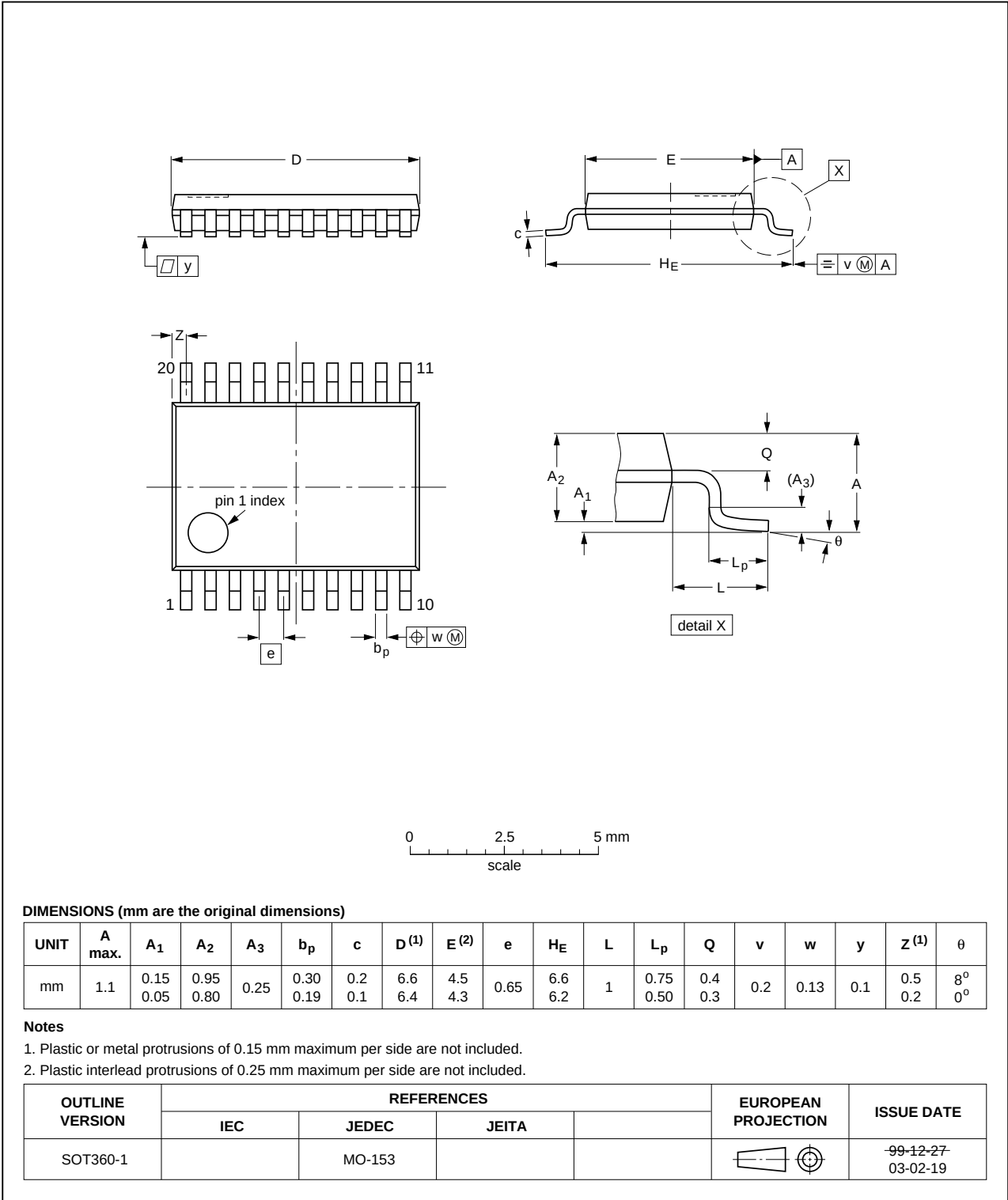


Fig 12. Package outline SOT360-1 (TSSOP20)

## 13. Abbreviations

Table 10. Abbreviations

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

## 14. Revision history

Table 11. Revision history

| Document ID          | Release date | Data sheet status  | Change notice | Supersedes |
|----------------------|--------------|--------------------|---------------|------------|
| 74HC_HCT574_Q100 v.1 | 20120802     | Product data sheet | -             | -          |

## 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.                                     |

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[2] The term 'short data sheet' is explained in section "Definitions".

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