

# 74HC574; 74HCT574

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

Rev. 10 — 5 August 2024

Product data sheet

## 1. General description

The 74HC574; 74HCT574 is an 8-bit positive-edge triggered D-type flip-flop with 3-state outputs. The device features a clock (CP) and output enable ( $\overline{OE}$ ) inputs. The flip-flops will store the state of their individual D-inputs that meet the set-up and hold time requirements on the LOW-to-HIGH clock (CP) transition. A HIGH on  $\overline{OE}$  causes the outputs to assume a high-impedance OFF-state. Operation of the  $\overline{OE}$  input does not affect the state of the flip-flops. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ .

## 2. Features and benefits

- Wide supply voltage range from 2.0 V to 6.0 V
- CMOS low power dissipation
- High noise immunity
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Complies with JEDEC standards:
  - JESD8C (2.7 V to 3.6 V)
  - JESD7A (2.0 V to 6.0 V)
- Input levels:
  - For 74HC574: CMOS level
  - For 74HCT574: TTL level
- 3-state non-inverting outputs for bus oriented applications
- 8-bit positive, edge-triggered register
- Common 3-state output enable input
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

## 3. Ordering information

Table 1. Ordering information

| Type number   | Package           |          |  |                          |
|---|-------------------|----------|--|--------------------------|
|   | Temperature range | Name     | Description  | Version                  |
| <a href="#">74HC574D</a><br><a href="#">74HCT574D</a>   | -40 °C to +125 °C | SO20     | plastic small outline package; 20 leads; body width 7.5 mm   | <a href="#">SOT163-1</a> |
| <a href="#">74HC574PW</a><br><a href="#">74HCT574PW</a> | -40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads; body width 4.4 mm   | <a href="#">SOT360-1</a> |
| <a href="#">74HC574BQ</a>                               | -40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 × 4.5 × 0.85 mm | <a href="#">SOT764-1</a> |

4. Functional diagram

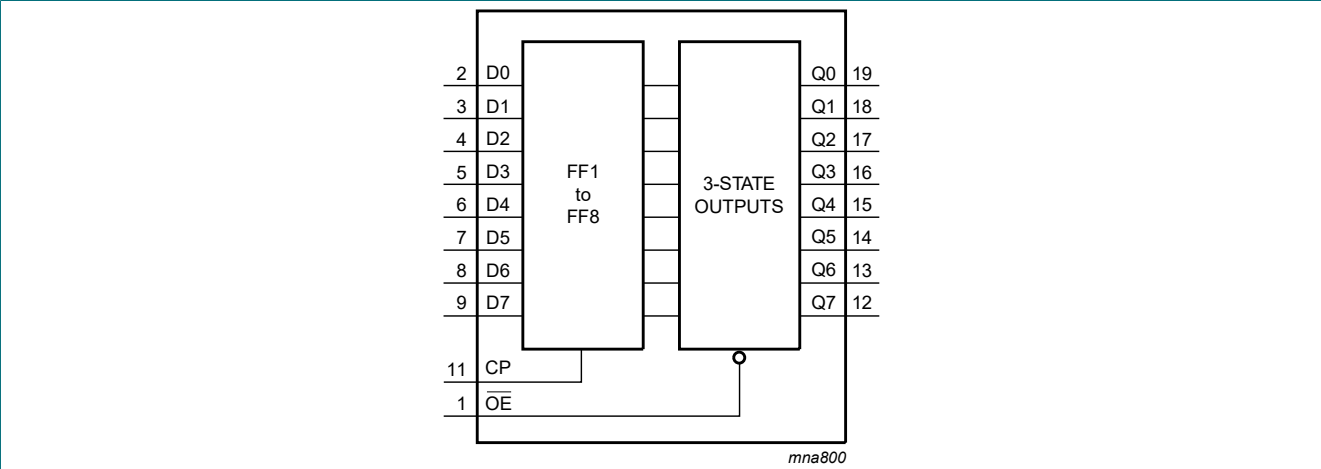


Fig. 1. Functional diagram

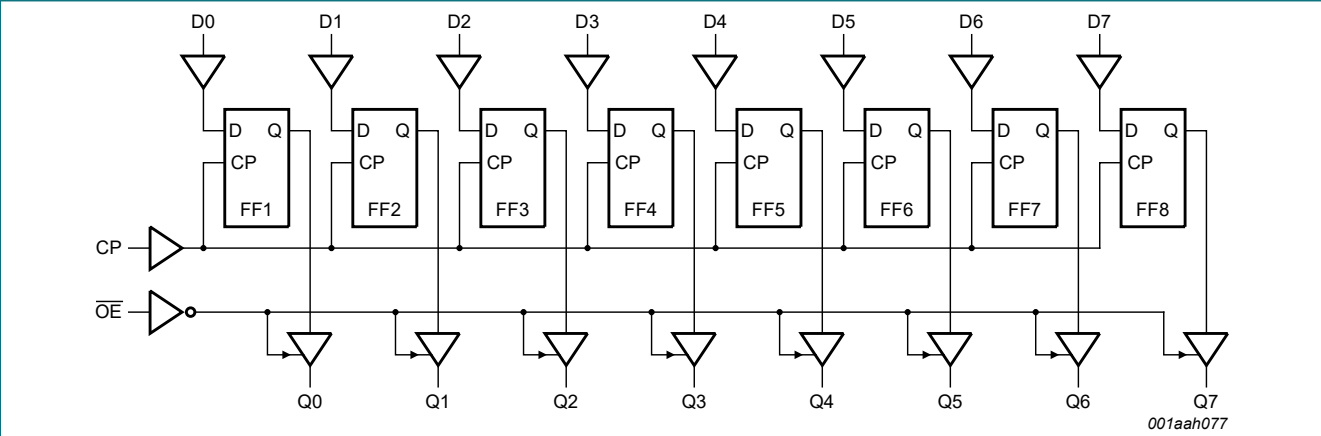


Fig. 2. Logic diagram

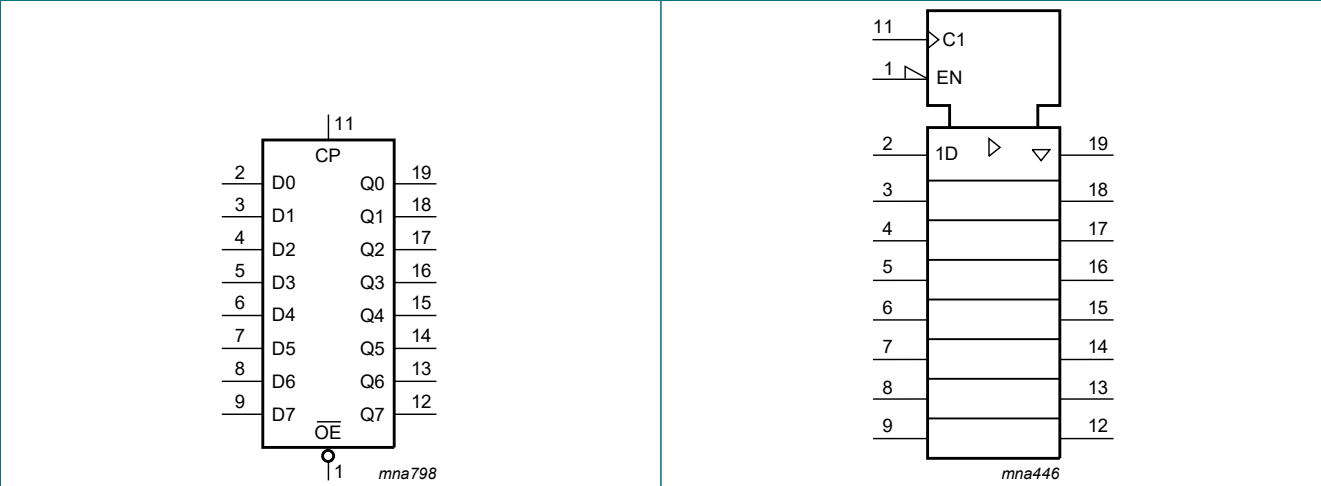


Fig. 3. Logic symbol

Fig. 4. IEC logic symbol

5. Pinning information

5.1. Pinning

**D package**  
**SOT163-1 (SO20)**

aaa-035109

**PW package**  
**SOT360-1 (TSSOP20)**

aaa-035110

**BQ package**  
**SOT764-1 (DHVQFN20)**

aaa-035111

Transparent top view

(1) This is not a ground pin. There is no electrical or mechanical requirement to solder the pad. In case soldered, the solder land should remain floating or connected to GND.

5.2. Pin description

Table 2. Pin description

| Symbol                         | Pin                            | Description                               |
|--------------------------------|--------------------------------|---|
| OE                             | 1                              | 3-state output enable input (active LOW)  |
| D0, D1, D2, D3, D4, D5, D6, D7 | 2, 3, 4, 5, 6, 7, 8, 9         | data inputs                               |
| GND                            | 10                             | ground (0 V)                              |
| CP                             | 11                             | clock input (LOW-to-HIGH, edge triggered) |
| Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7 | 19, 18, 17, 16, 15, 14, 13, 12 | 3-state flip-flop outputs                 |
| VCC                            | 20                             | supply voltage                            |

6. Functional description

Table 3. Function table

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.

| Operating mode                   | Input |    |    | Internal flip-flop | Output |
|----------------------------------|-------|----|----|--------------------|--------|
|                                  | OE    | CP | Dn |                    | Qn     |
| 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      |

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 | [1]   | -    | 500  | mW   |

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

8. Recommended operating conditions

Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

| Symbol           | Parameter                           | Conditions              | 74HC574 |      |                 | 74HCT574 |      |                 | Unit |
|------------------|-------------------------------------|-------------------------|---------|------|-----------------|----------|------|-----------------|------|
|                  |                                     |                         | Min     | Typ  | Max             | Min      | Typ  | Max             |      |
| V <sub>CC</sub>  | supply voltage                      |                         | 2.0     | 5.0  | 6.0             | 4.5      | 5.0  | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                         | 0       | -    | V <sub>CC</sub> | 0        | -    | V <sub>CC</sub> | V    |
| V <sub>O</sub>   | output voltage                      |                         | 0       | -    | V <sub>CC</sub> | 0        | -    | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                         | -40     | +25  | +125            | -40      | +25  | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 2.0 V | -       | -    | 625             | -        | -    | -               | ns/V |
|                  |                                     | V <sub>CC</sub> = 4.5 V | -       | 1.67 | 139             | -        | 1.67 | 139             | ns/V |
|                  |                                     | V <sub>CC</sub> = 6.0 V | -       | -    | 83              | -        | -    | -               | ns/V |

9. Static characteristics

Table 6. Static characteristics

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         |                           |  |       |      |      |                  |      |                   |       |      |
| 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; 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> ; V <sub>CC</sub> = 6.0 V; V <sub>O</sub> = V <sub>CC</sub> or GND | -     | -    | ±0.5 | -                | ±5.0 | -                 | ±10.0 | µA   |
| I <sub>CC</sub> | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 6.0 V                                 | -     | -    | 8.0  | -                | 80   | -                 | 160   | µA   |
| C <sub>I</sub>  | input capacitance         |  | -     | 3.5  | -    | -                | -    | -                 | -     | pF   |

| Symbol           | Parameter                 | Conditions   | 25 °C |      |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|------------------|---------------------------|--|-------|------|------|------------------|------|-------------------|------|------|
|                  |                           |  | Min   | Typ  | Max  | Min              | Max  | Min               | Max  |      |
| 74HCT574         |                           |  |       |      |      |                  |      |                   |      |      |
| V <sub>IH</sub>  | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V   | 2.0   | 1.6  | -    | 2.0              | -    | 2.0               | -    | V    |
| V <sub>IL</sub>  | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V   | -     | 1.2  | 0.8  | -                | 0.8  | -                 | 0.8  | V    |
| V <sub>OH</sub>  | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V  |       |      |      |                  |      |                   |      |      |
|                  |                           | I <sub>O</sub> = -20 µA  | 4.4   | 4.5  | -    | 4.4              | -    | 4.4               | -    | V    |
|                  |                           | I <sub>O</sub> = -6 mA   | 3.98  | 4.32 | -    | 3.84             | -    | 3.7               | -    | V    |
| V <sub>OL</sub>  | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V  |       |      |      |                  |      |                   |      |      |
|                  |                           | I <sub>O</sub> = 20 µA   | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                  |                           | I <sub>O</sub> = 6.0 mA  | -     | 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; V <sub>CC</sub> = 5.5 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> ; V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = V <sub>CC</sub> or GND                   | -     | -    | ±0.5 | -                | ±5.0 | -                 | ±10  | µA   |
| I <sub>CC</sub>  | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V   | -     | -    | 8.0  | -                | 80   | -                 | 160  | µA   |
| ΔI <sub>CC</sub> | additional supply current | V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A |       |      |      |                  |      |                   |      |      |
|                  |                           | per input pin; Dn inputs   | -     | 50   | 180  | -                | 225  | -                 | 245  | µA   |
|                  |                           | per input pin; $\overline{OE}$ input   | -     | 125  | 450  | -                | 563  | -                 | 613  | µA   |
|                  |                           | per input pin; CP input  | -     | 150  | 540  | -                | 675  | -                 | 735  | µA   |
| C <sub>I</sub>   | input capacitance         |  | -     | 3.5  | -    | -                | -    | -                 | -    | pF   |

10. Dynamic characteristics

Table 7. Dynamic characteristics

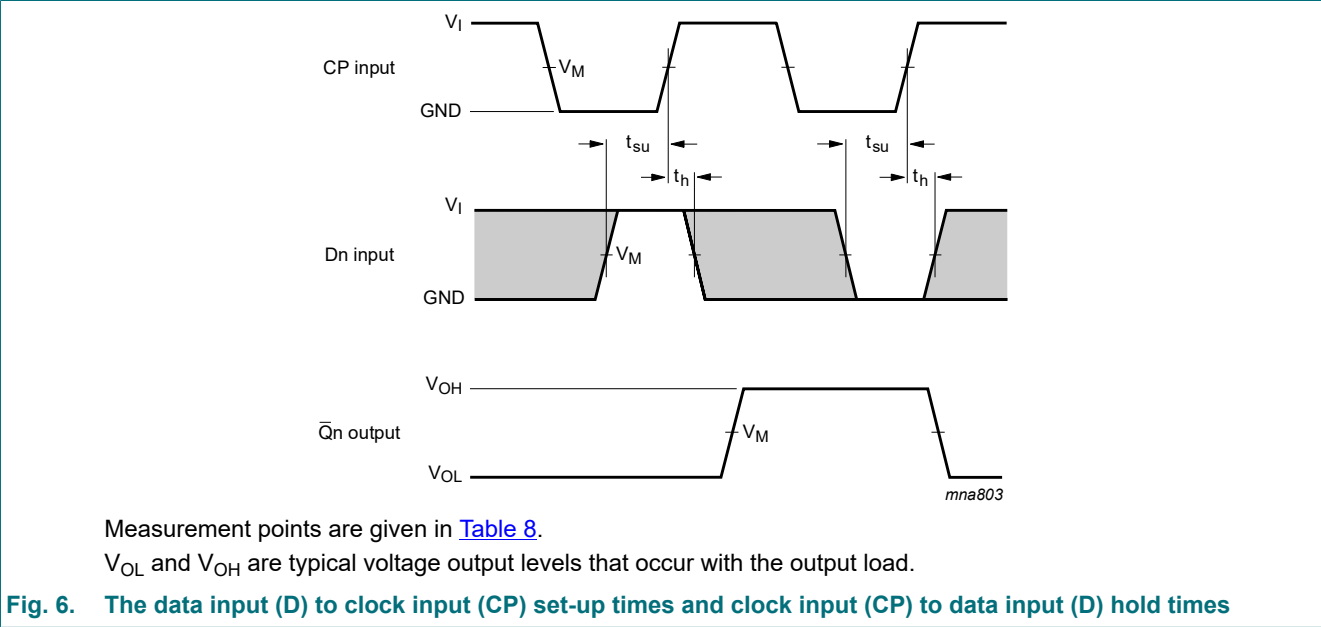
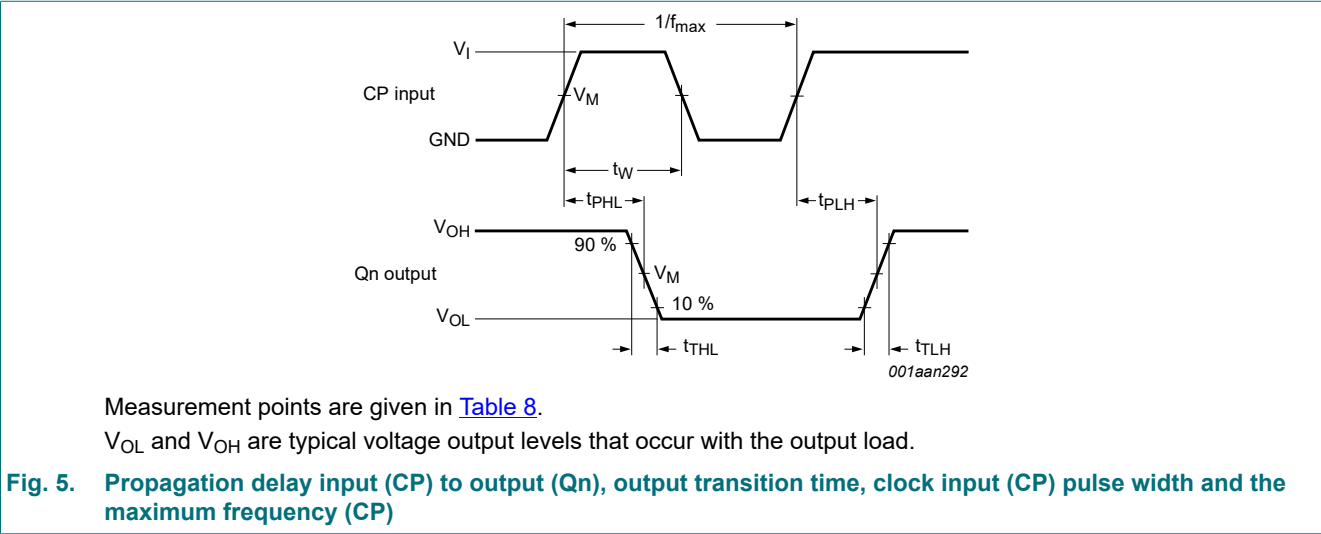
Voltages are referenced to GND (ground = 0 V);  $C_L = 50\text{ pF}$  unless otherwise specified; for test circuit see Fig. 8.

| Symbol           | Parameter                     | Conditions   | 25 °C |     |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|------------------|-------------------------------|--|-------|-----|-----|------------------|-----|-------------------|-----|------|
|                  |                               |  | Min   | Typ | Max | Min              | Max | Min               | Max |      |
| 74HC574          |                               |  |       |     |     |                  |     |                   |     |      |
| t <sub>pd</sub>  | propagation delay             | CP to Qn; see <a href="#">Fig. 5</a> [1]                                       |       |     |     |                  |     |                   |     |      |
|                  |                               | 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                   | OE to Qn; see <a href="#">Fig. 7</a> [2]                                       |       |     |     |                  |     |                   |     |      |
|                  |                               | 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                  | OE to Qn; see <a href="#">Fig. 7</a> [3]                                       |       |     |     |                  |     |                   |     |      |
|                  |                               | 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="#">Fig. 5</a> [4]   |       |     |     |                  |     |                   |     |      |
|                  |                               | 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="#">Fig. 6</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="#">Fig. 6</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="#">Fig. 6</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="#">Fig. 5</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  |
| C <sub>PD</sub>  | power dissipation capacitance | C <sub>L</sub> = 50 pF; f = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [5] | -     | 22  | -   | -                | -   | -                 | -   | pF   |

| Symbol           | Parameter                     | Conditions   | 25 °C |     |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|------------------|-------------------------------|--|-------|-----|-----|------------------|-----|-------------------|-----|------|
|                  |                               |  | Min   | Typ | Max | Min              | Max | Min               | Max |      |
| 74HCT574         |                               |  |       |     |     |                  |     |                   |     |      |
| t <sub>pd</sub>  | propagation delay             | CP to Qn; see <a href="#">Fig. 5</a> [1]   |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V  | -     | 18  | 33  | -                | 41  | -                 | 50  | ns   |
|                  |                               | V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF  | -     | 15  | -   | -                | -   | -                 | -   | ns   |
| t <sub>en</sub>  | enable time                   | $\overline{\text{OE}}$ to Qn; see <a href="#">Fig. 7</a> [2]                           |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V  | -     | 19  | 33  | -                | 41  | -                 | 50  | ns   |
| t <sub>dis</sub> | disable time                  | $\overline{\text{OE}}$ to Qn; see <a href="#">Fig. 7</a> [3]                           |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V  | -     | 16  | 28  | -                | 35  | -                 | 42  | ns   |
| t <sub>t</sub>   | transition time               | Qn; see <a href="#">Fig. 5</a> [4]   |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V  | -     | 5   | 12  | -                | 15  | -                 | 18  | ns   |
| t <sub>W</sub>   | pulse width                   | CP HIGH or LOW; see <a href="#">Fig. 6</a>   |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V  | 16    | 7   | -   | 20               | -   | 24                | -   | ns   |
| t <sub>su</sub>  | set-up time                   | Dn to CP; see <a href="#">Fig. 6</a>   |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V  | 12    | 3   | -   | 15               | -   | 18                | -   | ns   |
| t <sub>h</sub>   | hold time                     | Dn to CP; see <a href="#">Fig. 6</a>   |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V  | 5     | -1  | -   | 5                | -   | 5                 | -   | ns   |
| f <sub>max</sub> | maximum frequency             | CP; see <a href="#">Fig. 5</a>   |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V  | 30    | 69  | -   | 24               | -   | 20                | -   | MHz  |
|                  |                               | V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF  | -     | 76  | -   | -                | -   | -                 | -   | MHz  |
| C <sub>PD</sub>  | power dissipation capacitance | C <sub>L</sub> = 50 pF; f = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> - 1.5 V [5] | -     | 25  | -   | -                | -   | -                 | -   | pF   |

[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.  
[2] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.  
[3] t<sub>dis</sub> is the same as t<sub>PLZ</sub> and t<sub>PHZ</sub>.  
[4] t<sub>t</sub> is the same as t<sub>THL</sub> and t<sub>TLH</sub>.  
[5] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).  
P<sub>D</sub> = C<sub>PD</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>i</sub> × N + Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) where:  
f<sub>i</sub> = input frequency in MHz;  
f<sub>o</sub> = output frequency in MHz;  
C<sub>L</sub> = output load capacitance in pF;  
V<sub>CC</sub> = supply voltage in V;  
N = number of inputs switching;  
Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of outputs.

10.1. Waveforms and test circuit



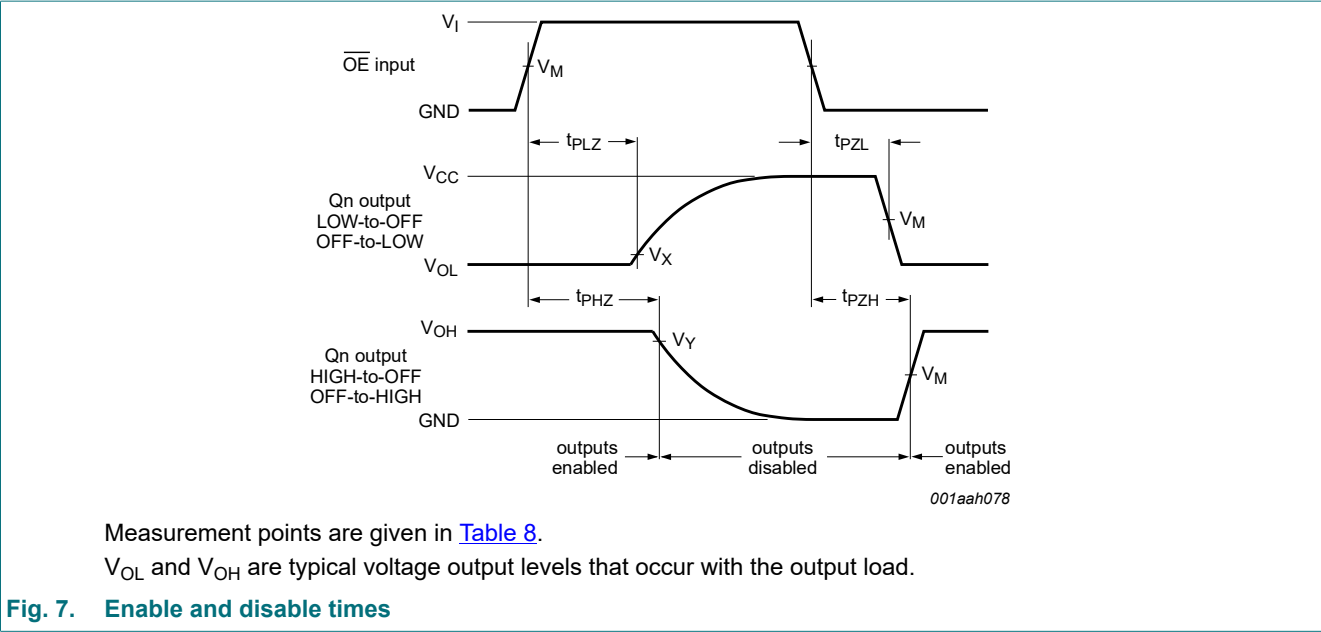


Table 8. Measurement points

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

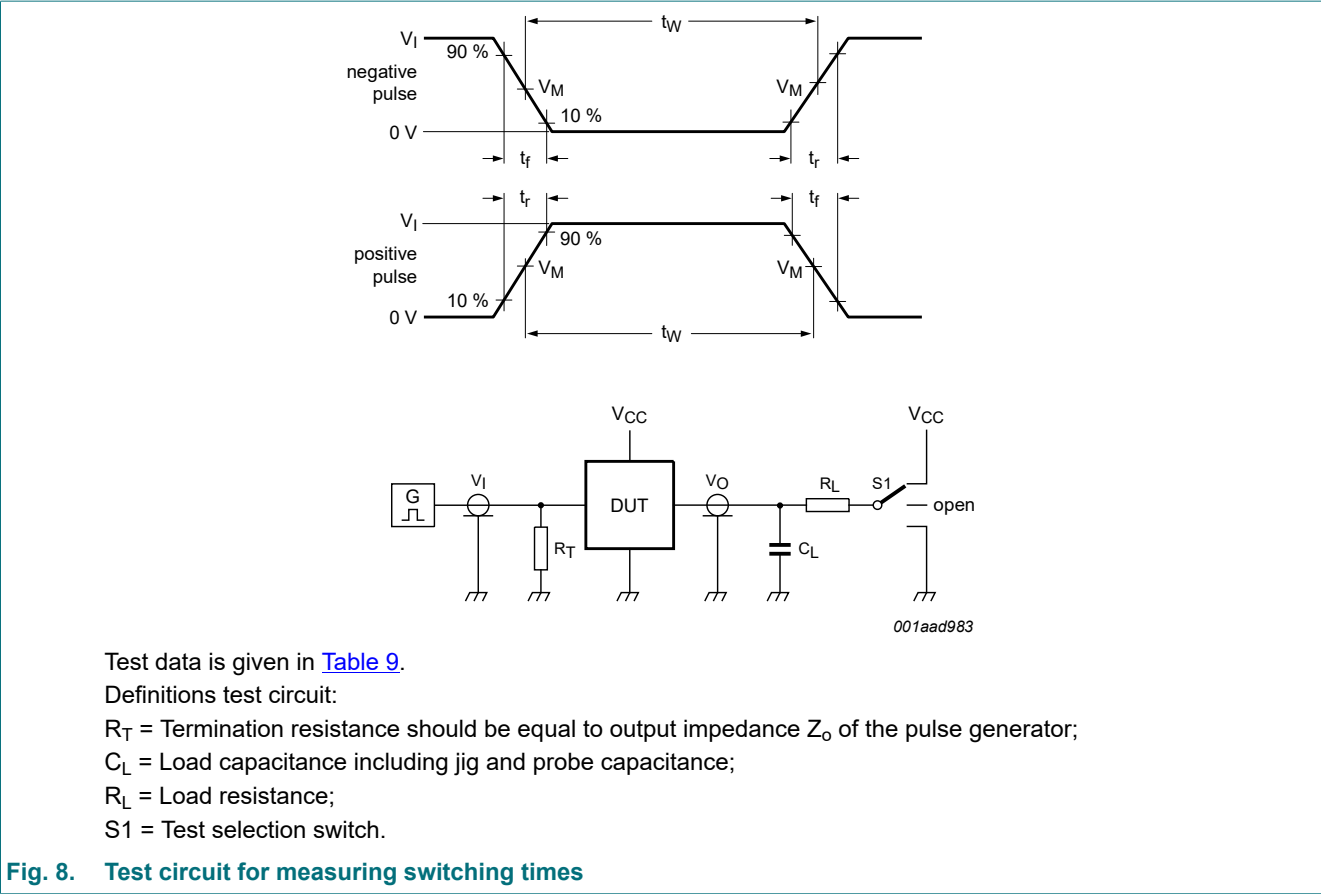


Fig. 8. Test circuit for measuring switching times

Table 9. Test data

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

11. Package outline

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

SOT163-1

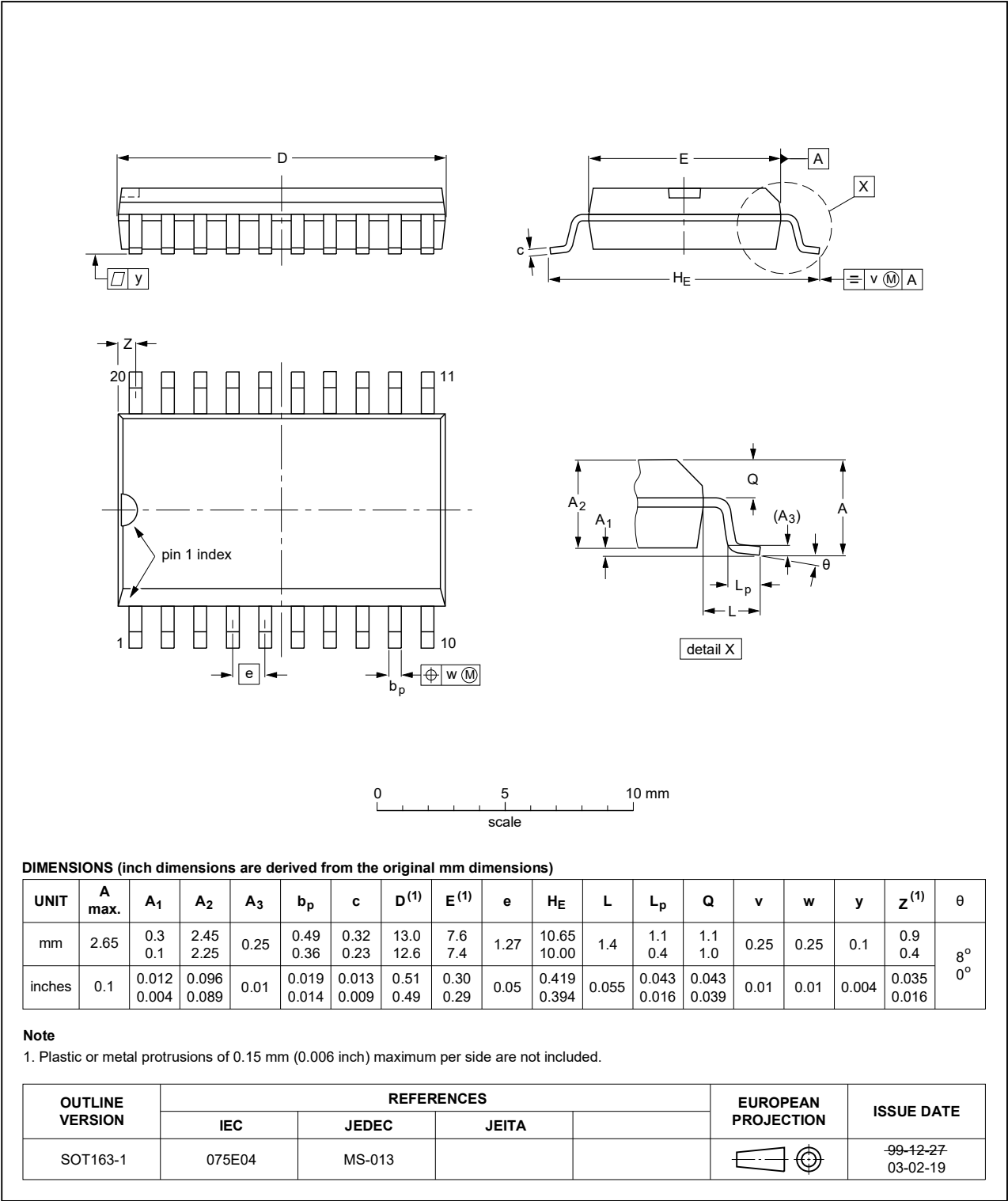


Fig. 9. Package outline SOT163-1 (SO20)

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

SOT360-1

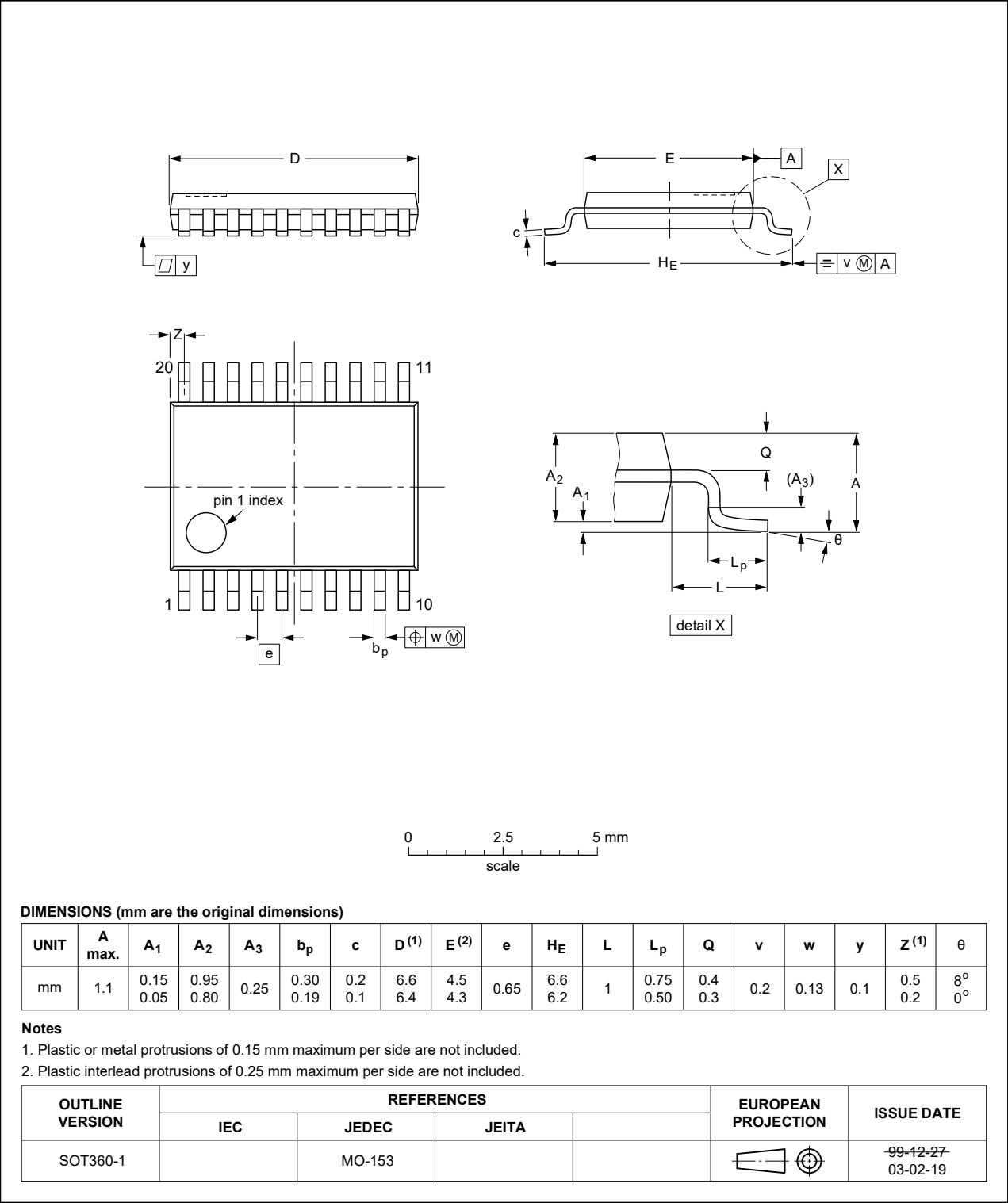


Fig. 10. Package outline SOT360-1 (TSSOP20)

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

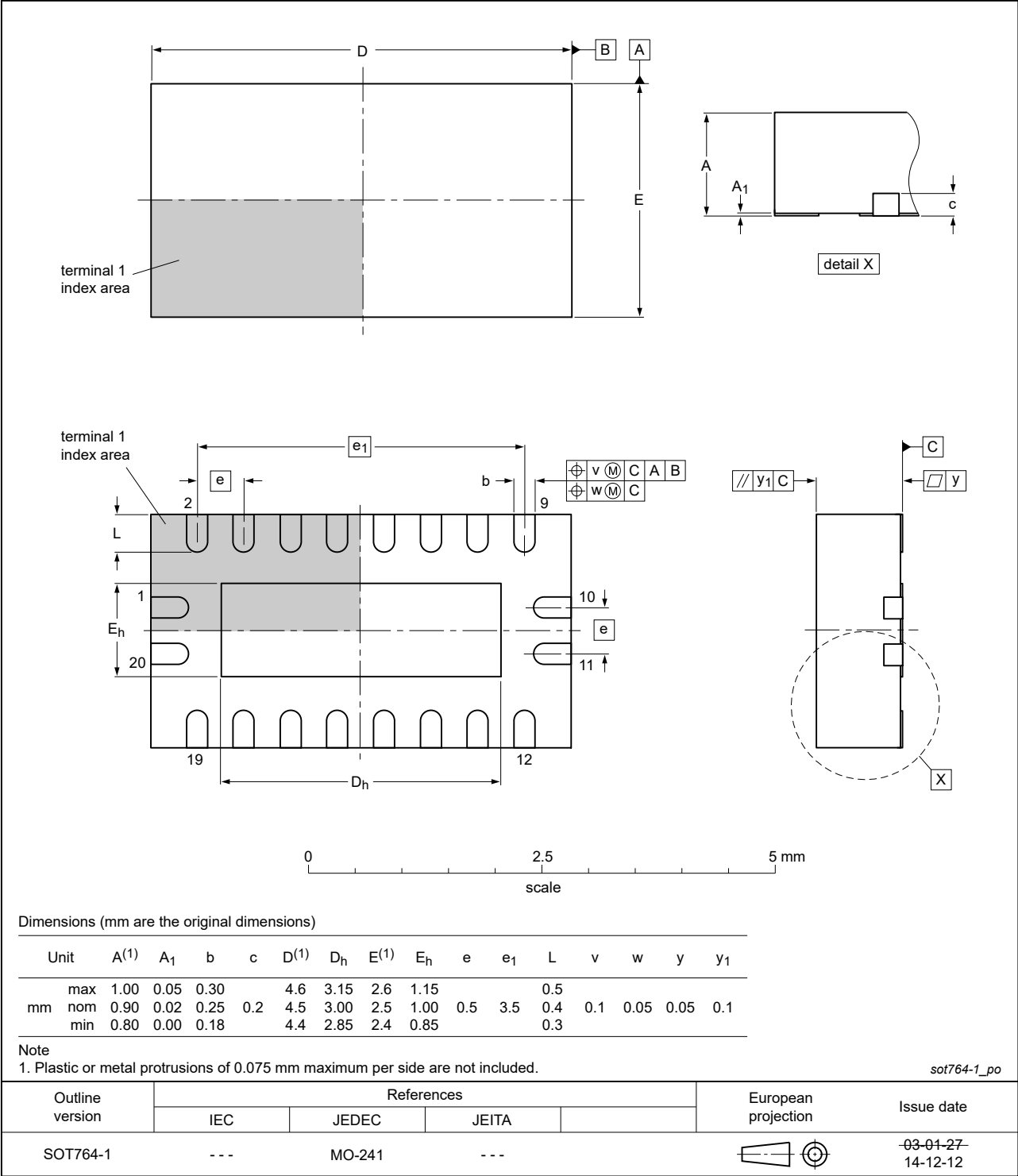


Fig. 11. Package outline SOT764-1 (DHVQFN20)

12. Abbreviations

Table 10. Abbreviations

| Acronym | Description                               |
|---------|---|
| ANSI    | American National Standards Institute     |
| CDM     | Charged Device Model                      |
| CMOS    | Complementary Metal Oxide Semiconductor   |
| DUT     | Device Under Test                         |
| ESD     | ElectroStatic Discharge                   |
| ESDA    | ElectroStatic Discharge Association       |
| HBM     | Human Body Model                          |
| JEDEC   | Joint Electron Device Engineering Council |
| TTL     | Transistor-Transistor Logic               |

13. Revision history

Table 11. Revision history

| Document ID         | Release date   | Data sheet status     | Change notice | Supersedes          |
|---------------------|--|-----------------------|---------------|---------------------|
| 74HC_HCT574 v.10    | 20240805   | Product data sheet    | -             | 74HC_HCT574 v.9     |
| Modifications:      | <ul style="list-style-type: none"><li><a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li></ul>   |                       |               |                     |
| 74HC_HCT574 v.9     | 20221020   | Product data sheet    | -             | 74HC_HCT574 v.8     |
| Modifications:      | <ul style="list-style-type: none"><li>Type number 74HC574BQ (SOT764-1/DHVQFN20) added.</li></ul>   |                       |               |                     |
| 74HC_HCT574 v.8     | 20210730   | Product data sheet    | -             | 74HC_HCT574 v.7     |
| Modifications:      | <ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li><li>Type numbers 74HC574DB and 74HCT574DB (SOT339-1/SSOP20) removed.</li><li><a href="#">Section 2</a> updated.</li><li><a href="#">Section 7</a>: Derating values for P<sub>tot</sub> total power dissipation updated.</li></ul> |                       |               |                     |
| 74HC_HCT574 v.7     | 20160304   | Product data sheet    | -             | 74HC_HCT574 v.6     |
| Modifications:      | <ul style="list-style-type: none"><li>Type numbers 74HC574N and 74HCT574N (SOT146-1) removed.</li></ul>  |                       |               |                     |
| 74HC_HCT574 v.6     | 20150126   | Product data sheet    | -             | 74HC_HCT574 v.5     |
| Modifications:      | <ul style="list-style-type: none"><li><a href="#">Section 7</a>: Power dissipation capacitance condition for 74HCT574 is corrected.</li></ul>  |                       |               |                     |
| 74HC_HCT574 v.5     | 20120425   | Product data sheet    | -             | 74HC_HCT574 v.4     |
| Modifications:      | <ul style="list-style-type: none"><li>V<sub>X</sub> and V<sub>Y</sub> measurement points added to <a href="#">Table 8</a>.</li></ul>   |                       |               |                     |
| 74HC_HCT574 v.4     | 20111219   | Product data sheet    | -             | 74HC_HCT574 v.3     |
| Modifications:      | <ul style="list-style-type: none"><li>Legal pages updated.</li></ul>   |                       |               |                     |
| 74HC_HCT574 v.3     | 20101215   | Product data sheet    | -             | 74HC_HCT574_CNV v.2 |
| 74HC_HCT574_CNV v.2 | 19970827   | Product specification | -             | -                   |

## 14. Legal information

### Data sheet status

| Document status [1][2]         | Product status [3] | Definition  |
|--------------------------------|--------------------|---|
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| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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