

# 74AHC273-Q100; 74AHCT273-Q100

Octal D-type flip-flop with reset; positive-edge trigger

Rev. 1 — 27 March 2013

Product data sheet

## 1. General description

The 74AHC273-Q100; 74AHCT273-Q100 is a high-speed Si-gate CMOS device and is pin compatible with Low-power Schottky TTL (LSTTL). It is specified in compliance with JEDEC standard No. 7-A.

The 74AHC273-Q100; 74AHCT273-Q100 has eight edge-triggered, D-type flip-flops with individual D inputs and Q outputs.

The common clock (CP) and master reset ( $\overline{\text{MR}}$ ) inputs, load and reset (clear) all flip-flops simultaneously. The state of each D input, one set-up time before the LOW-to-HIGH clock transition, is transferred to the corresponding output (Qn) of the flip-flop.

All outputs are forced LOW, independent of clock or data inputs, by a LOW on the  $\overline{\text{MR}}$  input.

The device is useful for applications where only the true output is required and the clock and master reset are common to all storage elements.

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

- 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  $+125\text{ }^{\circ}\text{C}$
- Balanced propagation delays
- All inputs have Schmitt-trigger actions
- Inputs accept voltages higher than  $V_{\text{CC}}$
- Ideal buffer for MOS microcontroller or memory
- Common clock and master reset
- Input levels:
  - ◆ For 74AHC273-Q100: CMOS level
  - ◆ For 74AHCT273-Q100: TTL level
- 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  |
| <b>74AHC273-Q100</b>  |                   |          |  |          |
| 74AHC273D-Q100        | −40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm  | SOT163-1 |
| 74AHC273PW-Q100       | −40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm  | SOT360-1 |
| 74AHC273BQ-Q100       | −40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced<br>very thin quad flat package; no leads;<br>20 terminals; body 2.5 × 4.5 × 0.85 mm | SOT764-1 |
| <b>74AHCT273-Q100</b> |                   |          |  |          |
| 74AHCT273D-Q100       | −40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm  | SOT163-1 |
| 74AHCT273PW-Q100      | −40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm  | SOT360-1 |
| 74AHCT273BQ-Q100      | −40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced<br>very thin quad flat package; no leads;<br>20 terminals; body 2.5 × 4.5 × 0.85 mm | SOT764-1 |

### 4. Functional diagram

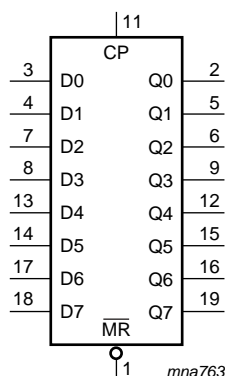


Fig 1. Logic symbol

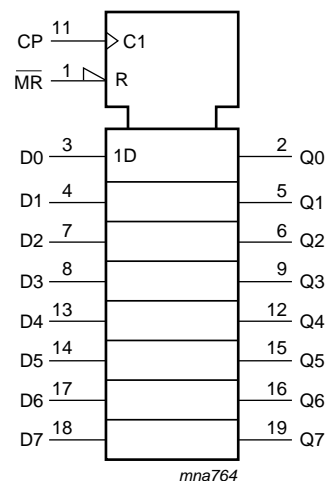


Fig 2. IEC logic symbol

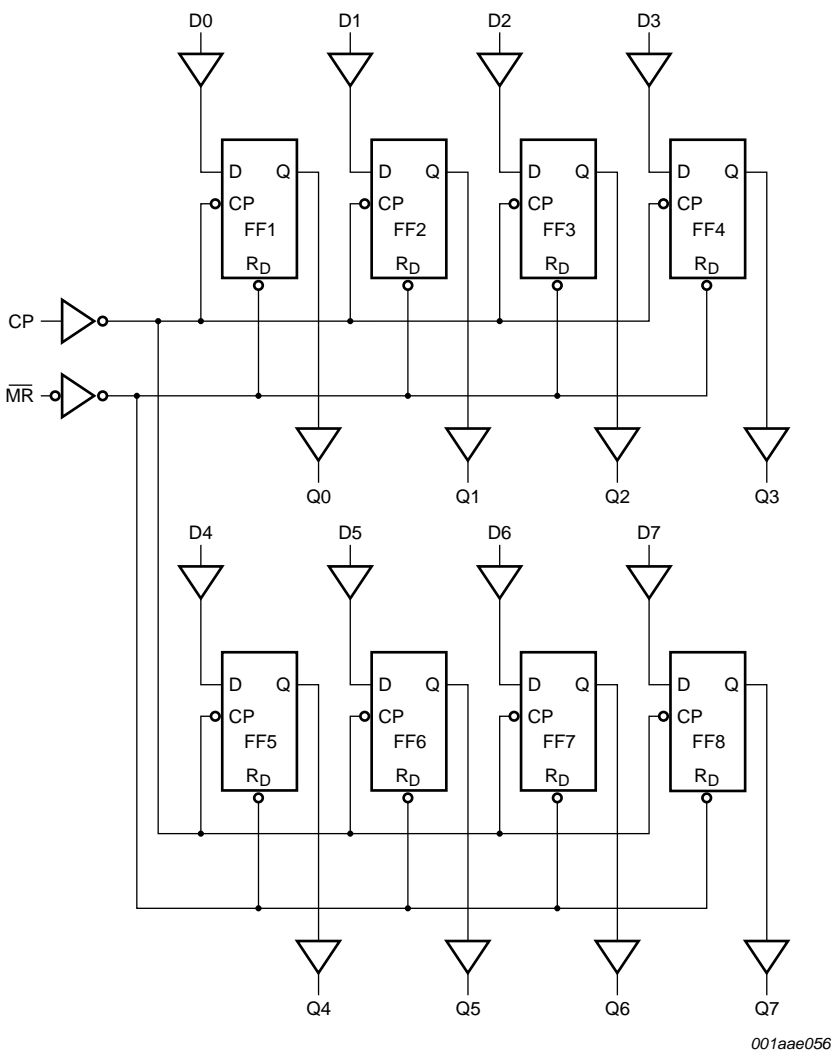


Fig 3. Logic diagram

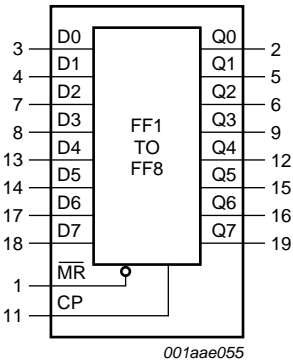
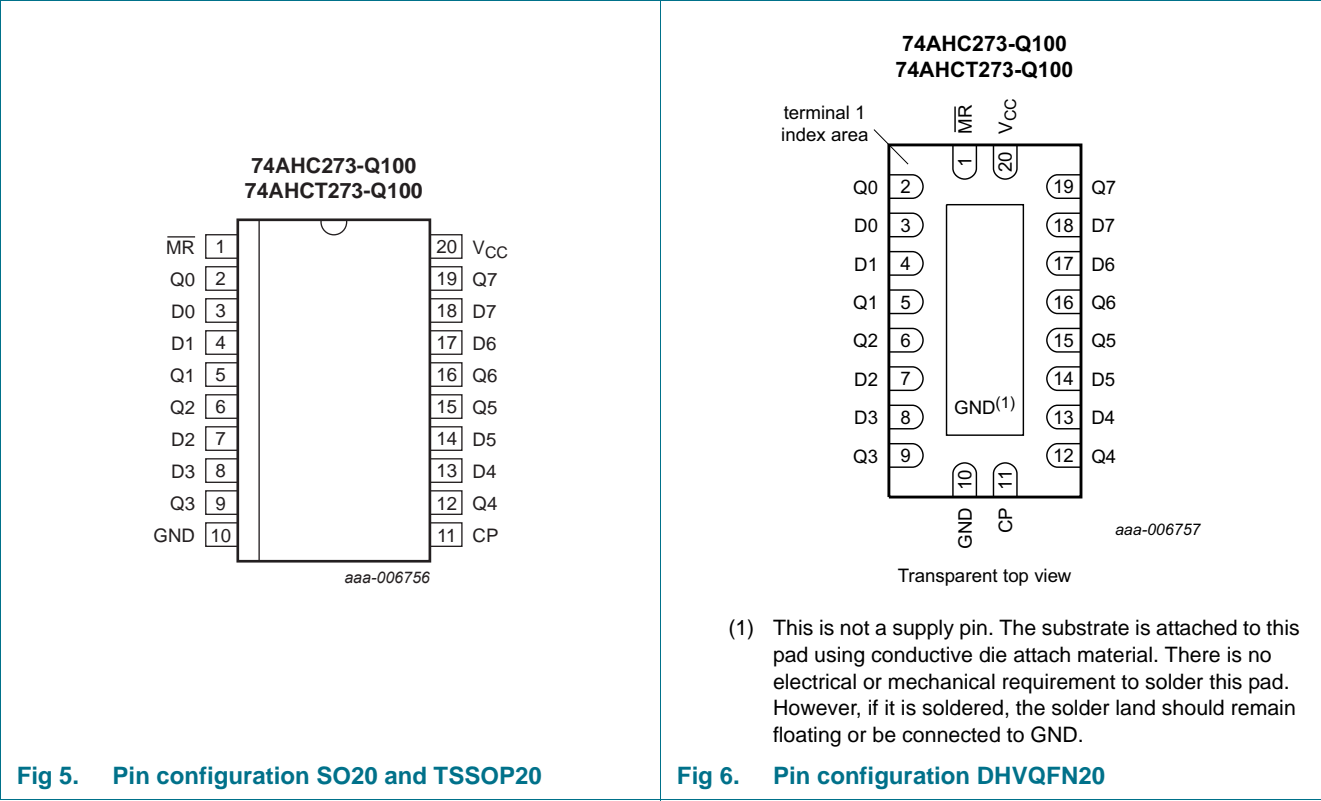


Fig 4. Functional diagram

5. Pinning information

5.1 Pinning



5.2 Pin description

Table 2. Pin description

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

## 6. Functional description

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

| Operating mode | Control |    | Input | Output |
|----------------|---------|----|-------|--------|
|                | MR      | CP | Dn    | Qn     |
| Reset (clear)  | L       | X  | X     | L      |
| Load '1'       | H       | ↑  | h     | H      |
| Load '0'       | H       | ↑  | l     | L      |

- [1] H = HIGH voltage level;  
 h = HIGH voltage level one set-up time prior to the LOW-to-HIGH CP transition;  
 L = LOW voltage level;  
 l = LOW voltage level one set-up time prior to the LOW-to-HIGH CP transition;  
 ↑ = LOW-to-HIGH;  
 X = don't care.

## 7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

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

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

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

## 8. Recommended operating conditions

**Table 5. Operating conditions**

| Symbol                | Parameter                           | Conditions                              | Min | Typ | Max      | Unit |
|-----------------------|-------------------------------------|---|-----|-----|----------|------|
| <b>74AHC273-Q100</b>  |                                     |   |     |     |          |      |
| $V_{CC}$              | supply voltage                      |   | 2.0 | 5.0 | 5.5      | V    |
| $V_I$                 | input voltage                       |   | 0   | -   | 5.5      | V    |
| $V_O$                 | output voltage                      |   | 0   | -   | $V_{CC}$ | V    |
| $T_{amb}$             | ambient temperature                 |   | -40 | +25 | +125     | °C   |
| $\Delta t/\Delta V$   | input transition rise and fall rate | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | -   | -   | 100      | ns/V |
|                       |                                     | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | -   | -   | 20       | ns/V |
| <b>74AHCT273-Q100</b> |                                     |   |     |     |          |      |
| $V_{CC}$              | supply voltage                      |   | 4.5 | 5.0 | 5.5      | V    |
| $V_I$                 | input voltage                       |   | 0   | -   | 5.5      | V    |
| $V_O$                 | output voltage                      |   | 0   | -   | $V_{CC}$ | V    |
| $T_{amb}$             | ambient temperature                 |   | -40 | +25 | +125     | °C   |
| $\Delta t/\Delta V$   | input transition rise and fall rate | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | -   | -   | 20       | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics**

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

| Symbol          | Parameter                 | Conditions  | 25 °C |     |      | −40 °C to +85 °C |      | −40 °C to +125 °C |      | Unit |
|-----------------|---------------------------|---|-------|-----|------|------------------|------|-------------------|------|------|
|                 |                           |   | Min   | Typ | Max  | Min              | Max  | Min               | Max  |      |
| 74AHC273-Q100   |                           |   |       |     |      |                  |      |                   |      |      |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V                             | 1.5   | -   | -    | 1.5              | -    | 1.5               | -    | V    |
|                 |                           | V <sub>CC</sub> = 3.0 V                             | 2.1   | -   | -    | 2.1              | -    | 2.1               | -    | V    |
|                 |                           | V <sub>CC</sub> = 5.5 V                             | 3.85  | -   | -    | 3.85             | -    | 3.85              | -    | V    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V                             | -     | -   | 0.5  | -                | 0.5  | -                 | 0.5  | V    |
|                 |                           | V <sub>CC</sub> = 3.0 V                             | -     | -   | 0.9  | -                | 0.9  | -                 | 0.9  | V    |
|                 |                           | V <sub>CC</sub> = 5.5 V                             | -     | -   | 1.65 | -                | 1.65 | -                 | 1.65 | 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> = −50 μA; V <sub>CC</sub> = 2.0 V    | 1.9   | 2.0 | -    | 1.9              | -    | 1.9               | -    | V    |
|                 |                           | I <sub>O</sub> = −50 μA; V <sub>CC</sub> = 3.0 V    | 2.9   | 3.0 | -    | 2.9              | -    | 2.9               | -    | V    |
|                 |                           | I <sub>O</sub> = −50 μA; V <sub>CC</sub> = 4.5 V    | 4.4   | 4.5 | -    | 4.4              | -    | 4.4               | -    | V    |
|                 |                           | I <sub>O</sub> = −4.0 mA; V <sub>CC</sub> = 3.0 V   | 2.58  | -   | -    | 2.48             | -    | 2.40              | -    | V    |
|                 |                           | I <sub>O</sub> = −8.0 mA; V <sub>CC</sub> = 4.5 V   | 3.94  | -   | -    | 3.80             | -    | 3.70              | -    | V    |
| V <sub>OL</sub> | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> |       |     |      |                  |      |                   |      |      |
|                 |                           | I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 2.0 V     | -     | 0   | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |                           | I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 3.0 V     | -     | 0   | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |                           | I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 4.5 V     | -     | 0   | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |                           | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V    | -     | -   | 0.36 | -                | 0.44 | -                 | 0.55 | V    |
|                 |                           | I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V    | -     | -   | 0.36 | -                | 0.44 | -                 | 0.55 | V    |

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

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

| Symbol                | Parameter                 | Conditions  | 25 °C |     |      | –40 °C to +85 °C |      | –40 °C to +125 °C |      | Unit          |
|-----------------------|---------------------------|---|-------|-----|------|------------------|------|-------------------|------|---------------|
|                       |                           |   | Min   | Typ | Max  | Min              | Max  | Min               | Max  |               |
| $I_I$                 | input leakage current     | $V_I = 5.5 \text{ V}$ or GND;<br>$V_{CC} = 0 \text{ V}$ to 5.5 V  | -     | -   | 0.1  | -                | 1.0  | -                 | 2.0  | $\mu\text{A}$ |
| $I_{CC}$              | supply current            | $V_I = V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 5.5 \text{ V}$  | -     | -   | 4.0  | -                | 40   | -                 | 80   | $\mu\text{A}$ |
| $C_I$                 | input capacitance         |   | -     | 3   | 10   | -                | 10   | -                 | 10   | pF            |
| $C_O$                 | output capacitance        |   | -     | 4   | -    | -                | -    | -                 | -    | pF            |
| <b>74AHCT273-Q100</b> |                           |   |       |     |      |                  |      |                   |      |               |
| $V_{IH}$              | HIGH-level input voltage  | $V_{CC} = 4.5 \text{ V}$ to 5.5 V   | 2.0   | -   | -    | 2.0              | -    | 2.0               | -    | V             |
| $V_{IL}$              | LOW-level input voltage   | $V_{CC} = 4.5 \text{ V}$ to 5.5 V   | -     | -   | 0.8  | -                | 0.8  | -                 | 0.8  | V             |
| $V_{OH}$              | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$   |       |     |      |                  |      |                   |      |               |
|                       |                           | $I_O = -50 \mu\text{A}$   | 4.4   | -   | -    | 4.4              | -    | 4.4               | -    | V             |
|                       |                           | $I_O = -8.0 \text{ mA}$   | 3.94  | -   | -    | 3.80             | -    | 3.70              | -    | V             |
| $V_{OL}$              | LOW-level output voltage  | $V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$   |       |     |      |                  |      |                   |      |               |
|                       |                           | $I_O = 50 \mu\text{A}$  | -     | 0   | 0.1  | -                | 0.1  | -                 | 0.1  | V             |
|                       |                           | $I_O = 8.0 \text{ mA}$  | -     | -   | 0.36 | -                | 0.44 | -                 | 0.55 | V             |
| $I_I$                 | input leakage current     | $V_I = 5.5 \text{ V}$ or GND;<br>$V_{CC} = 0 \text{ V}$ to 5.5 V  | -     | -   | 0.1  | -                | 1.0  | -                 | 2.0  | $\mu\text{A}$ |
| $I_{CC}$              | supply current            | $V_I = V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 5.5 \text{ V}$  | -     | -   | 4.0  | -                | 40   | -                 | 80   | $\mu\text{A}$ |
| $\Delta I_{CC}$       | additional supply current | per input pin;<br>$V_I = V_{CC} - 2.1 \text{ V}$ ; other pins<br>at $V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 4.5 \text{ V}$ to 5.5 V | -     | -   | 1.35 | -                | 1.5  | -                 | 1.5  | mA            |
| $C_I$                 | input capacitance         |   | -     | 3   | 10   | -                | 10   | -                 | 10   | pF            |
| $C_O$                 | output capacitance        |   | -     | 4   | -    | -                | -    | -                 | -    | pF            |

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#).

| Symbol           | Parameter         | Conditions                                   | 25 °C               |                    |      | –40 °C to +85 °C |      | –40 °C to +125 °C |      | Unit |
|------------------|-------------------|--|---------------------|--------------------|------|------------------|------|-------------------|------|------|
|                  |                   |  | Min                 | Typ <sup>[1]</sup> | Max  | Min              | Max  | Min               | Max  |      |
| 74AHC273-Q100    |                   |  |                     |                    |      |                  |      |                   |      |      |
| t <sub>pd</sub>  | propagation delay | CP to Qn; see <a href="#">Figure 7</a>       | <a href="#">[2]</a> |                    |      |                  |      |                   |      |      |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V             |                     |                    |      |                  |      |                   |      |      |
|                  |                   | C <sub>L</sub> = 15 pF                       | -                   | 6.0                | 13.6 | 1.0              | 16.0 | 1.0               | 17.0 | ns   |
|                  |                   | C <sub>L</sub> = 50 pF                       | -                   | 8.6                | 17.1 | 1.0              | 19.5 | 1.0               | 21.5 | ns   |
|                  |                   | V <sub>CC</sub> = 4.5 V to 5.5 V             |                     |                    |      |                  |      |                   |      |      |
|                  |                   | C <sub>L</sub> = 15 pF                       | -                   | 4.2                | 9    | 1.0              | 10.5 | 1.0               | 11.5 | ns   |
|                  |                   | C <sub>L</sub> = 50 pF                       | -                   | 6.0                | 11.0 | 1.0              | 12.5 | 1.0               | 14.0 | ns   |
|                  |                   | MR to Qn; see <a href="#">Figure 8</a>       | <a href="#">[3]</a> |                    |      |                  |      |                   |      |      |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V             |                     |                    |      |                  |      |                   |      |      |
|                  |                   | C <sub>L</sub> = 15 pF                       | -                   | 5.1                | 13.6 | 1.0              | 16.0 | 1.0               | 17.0 | ns   |
|                  |                   | C <sub>L</sub> = 50 pF                       | -                   | 7.3                | 17.1 | 1.0              | 19.5 | 1.0               | 21.5 | ns   |
|                  |                   | V <sub>CC</sub> = 4.5 V to 5.5 V             |                     |                    |      |                  |      |                   |      |      |
|                  |                   | C <sub>L</sub> = 15 pF                       | -                   | 3.7                | 8.5  | 1.0              | 10.0 | 1.0               | 11.0 | ns   |
|                  |                   | C <sub>L</sub> = 50 pF                       | -                   | 5.3                | 10.5 | 1.0              | 12.0 | 1.0               | 13.5 | ns   |
| f <sub>max</sub> | maximum frequency | see <a href="#">Figure 7</a>                 |                     |                    |      |                  |      |                   |      |      |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V             |                     |                    |      |                  |      |                   |      |      |
|                  |                   | C <sub>L</sub> = 15 pF                       | 75                  | 120                | -    | 65               | -    | 65                | -    | MHz  |
|                  |                   | C <sub>L</sub> = 50 pF                       | 50                  | 75                 | -    | 45               | -    | 45                | -    | MHz  |
|                  |                   | V <sub>CC</sub> = 4.5 V to 5.5 V             |                     |                    |      |                  |      |                   |      |      |
|                  |                   | C <sub>L</sub> = 15 pF                       | 120                 | 165                | -    | 100              | -    | 100               | -    | MHz  |
| t <sub>w</sub>   | pulse width       | CP HIGH or LOW; see <a href="#">Figure 7</a> |                     |                    |      |                  |      |                   |      |      |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V             | 5.0                 | -                  | -    | 6.5              | -    | 6.5               | -    | ns   |
|                  |                   | V <sub>CC</sub> = 4.5 V to 5.5 V             | 5.0                 | -                  | -    | 5.0              | -    | 5.0               | -    | ns   |
|                  |                   | MR LOW; see <a href="#">Figure 8</a>         |                     |                    |      |                  |      |                   |      |      |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V             | 5.0                 | -                  | -    | 6.0              | -    | 6.0               | -    | ns   |
|                  |                   | V <sub>CC</sub> = 4.5 V to 5.5 V             | 5.0                 | -                  | -    | 5.0              | -    | 5.0               | -    | ns   |
| t <sub>su</sub>  | set-up time       | Dn to CP; see <a href="#">Figure 9</a>       |                     |                    |      |                  |      |                   |      |      |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V             | 3.0                 | -                  | -    | 3.0              | -    | 3.0               | -    | ns   |
|                  |                   | V <sub>CC</sub> = 4.5 V to 5.5 V             | 3.0                 | -                  | -    | 3.0              | -    | 3.0               | -    | ns   |
| t <sub>h</sub>   | hold time         | Dn to CP; see <a href="#">Figure 9</a>       |                     |                    |      |                  |      |                   |      |      |
|                  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V             | 1.0                 | -                  | -    | 1.0              | -    | 1.0               | -    | ns   |
|                  |                   | V <sub>CC</sub> = 4.5 V to 5.5 V             | 1.0                 | -                  | -    | 1.0              | -    | 1.0               | -    | ns   |



**Table 7. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#).

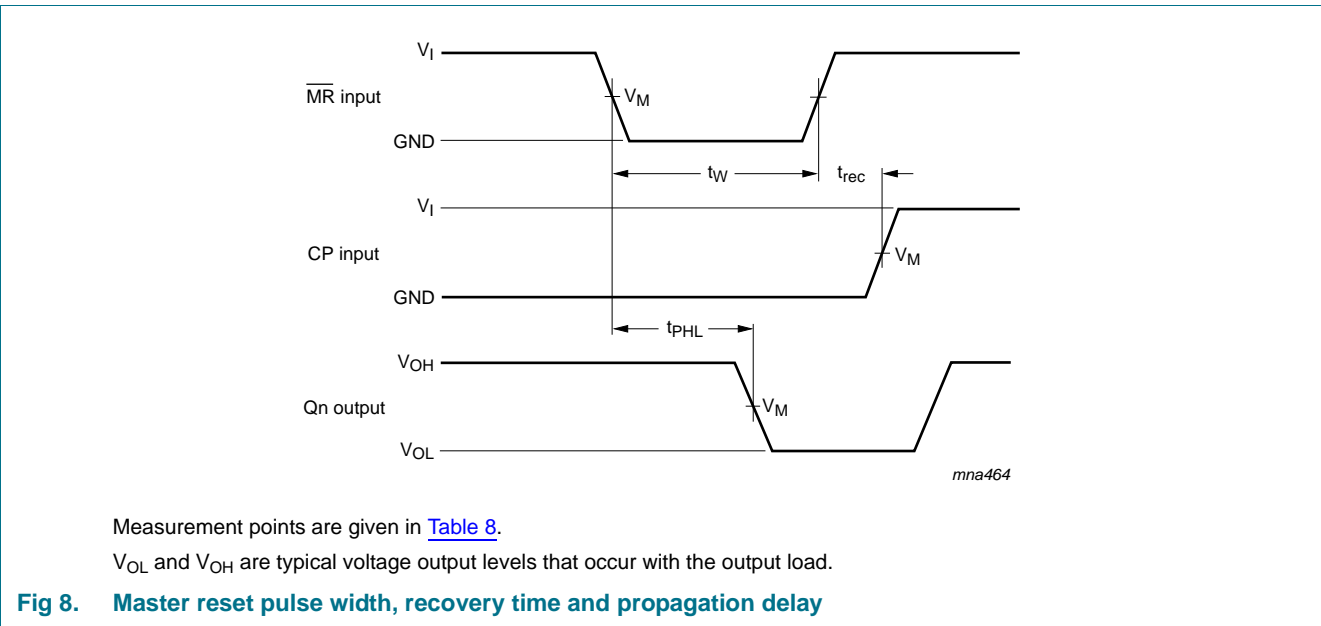
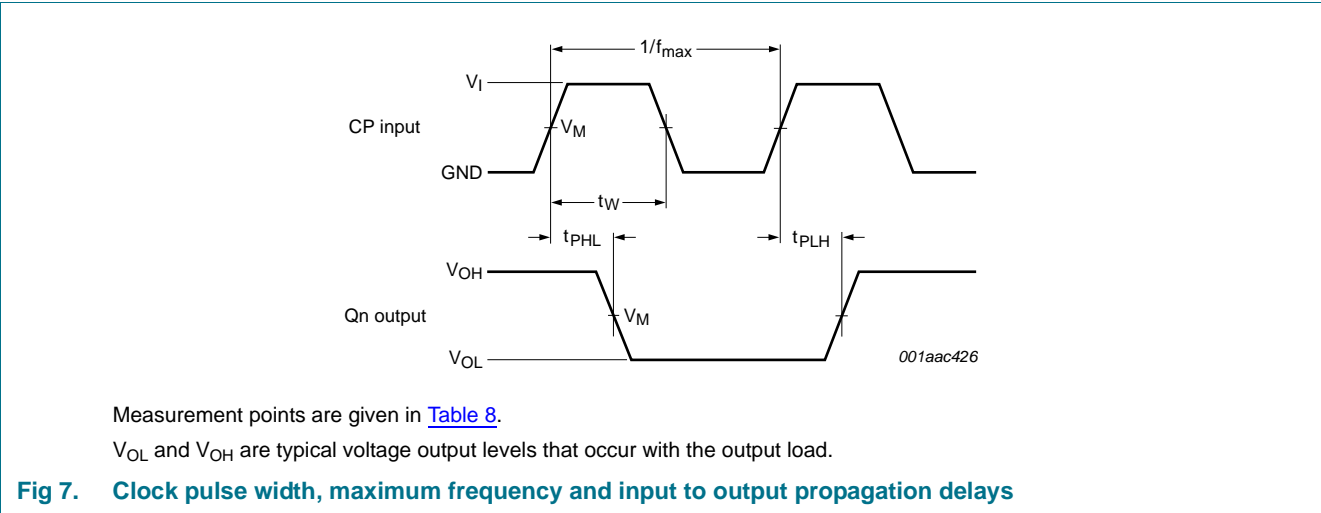
| Symbol   | Parameter                     | Conditions   | 25 °C |                    |      | –40 °C to +85 °C |      | –40 °C to +125 °C |      | Unit |
|--|-------------------------------|--|-------|--------------------|------|------------------|------|-------------------|------|------|
|  |                               |  | Min   | Typ <sup>[1]</sup> | Max  | Min              | Max  | Min               | Max  |      |
| t <sub>rec</sub>                                       | recovery time                 | MR to CP; see <a href="#">Figure 8</a>   |       |                    |      |                  |      |                   |      |      |
|  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.5   | -                  | -    | 2.5              | -    | 2.5               | -    | ns   |
|  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   | 2.0   | -                  | -    | 2.0              | -    | 2.0               | -    | ns   |
| C <sub>PD</sub>  | power dissipation capacitance | f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[4]</sup> | -     | 14                 | -    | -                | -    | -                 | -    | pF   |
| <b>74AHCT273-Q100; V<sub>CC</sub> = 4.5 V to 5.5 V</b> |                               |  |       |                    |      |                  |      |                   |      |      |
| t <sub>pd</sub>  | propagation delay             | CP to Qn; see <a href="#">Figure 7</a> <sup>[2]</sup>                          |       |                    |      |                  |      |                   |      |      |
|  |                               | C <sub>L</sub> = 15 pF   | -     | 4.0                | 7.5  | 1.0              | 8.8  | 1.0               | 9.5  | ns   |
|  |                               | C <sub>L</sub> = 50 pF   | -     | 5.8                | 9.2  | 1.0              | 10.5 | 1.0               | 11.5 | ns   |
|  |                               | MR to Qn; see <a href="#">Figure 8</a> <sup>[3]</sup>                          |       |                    |      |                  |      |                   |      |      |
|  |                               | C <sub>L</sub> = 15 pF   | -     | 3.9                | 10.0 | 1.0              | 11.6 | 1.0               | 12.5 | ns   |
| f <sub>max</sub>                                       | maximum frequency             | see <a href="#">Figure 7</a>   |       |                    |      |                  |      |                   |      |      |
|  |                               | C <sub>L</sub> = 15 pF   | 75    | 120                | -    | 65               | -    | 65                | -    | MHz  |
|  |                               | C <sub>L</sub> = 50 pF   | 50    | 75                 | -    | 45               | -    | 45                | -    | MHz  |
| t <sub>W</sub>   | pulse width                   | CP HIGH or LOW; see <a href="#">Figure 7</a>                                   | 5.0   | -                  | -    | 6.5              | -    | 6.5               | -    | ns   |
|  |                               | MR LOW; see <a href="#">Figure 8</a>   | 5.0   | -                  | -    | 6.0              | -    | 6.0               | -    | ns   |
| t <sub>su</sub>  | set-up time                   | Dn to CP; see <a href="#">Figure 9</a>   | 3.0   | -                  | -    | 3.0              | -    | 3.0               | -    | ns   |
| t <sub>h</sub>   | hold time                     | Dn to CP; see <a href="#">Figure 9</a>   | 1.0   | -                  | -    | 1.0              | -    | 1.0               | -    | ns   |
| t <sub>rec</sub>                                       | recovery time                 | MR to CP; see <a href="#">Figure 8</a>   | 2.5   | -                  | -    | 2.5              | -    | 2.5               | -    | ns   |
| C <sub>PD</sub>  | power dissipation capacitance | f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[4]</sup> | -     | 18                 | -    | -                | -    | -                 | -    | pF   |

[1] Typical values are measured at nominal supply voltage (V<sub>CC</sub> = 3.3 V and V<sub>CC</sub> = 5.0 V).[2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.[3] t<sub>pd</sub> is the same as t<sub>PHL</sub> only.[4] 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 the outputs.

11. Waveforms



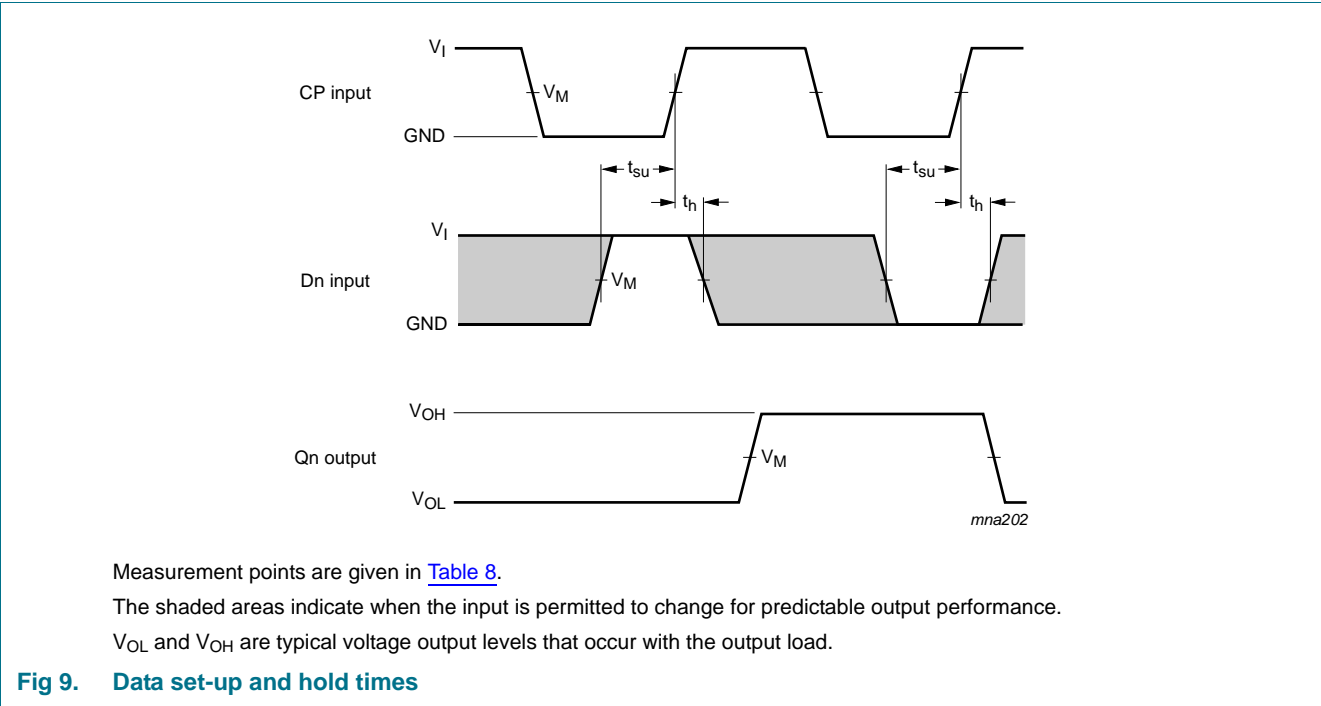
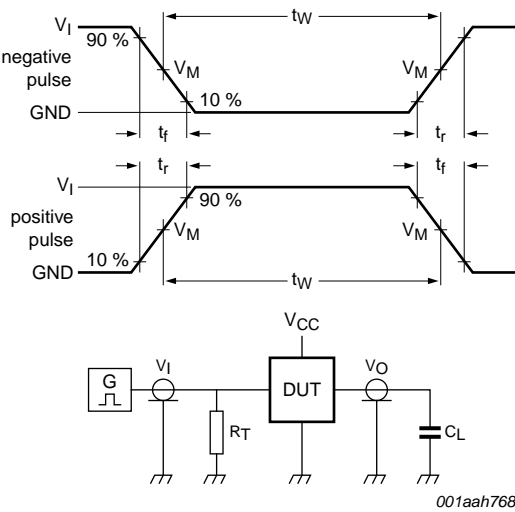


Table 8. Measurement points

| Type           | Input               | Output              |
|----------------|---------------------|---------------------|
|                | $V_M$               | $V_M$               |
| 74AHC273-Q100  | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ |
| 74AHCT273-Q100 | 1.5 V               | $0.5 \times V_{CC}$ |



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

Definitions test circuit:

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

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

Fig 10. Test circuit for measuring switching times

Table 9. Test data

| Type           | Input    |                       | Load         | Test               |
|----------------|----------|-----------------------|--------------|--------------------|
|                | $V_I$    | $t_r, t_f$            | $C_L$        |                    |
| 74AHC273-Q100  | $V_{CC}$ | $\leq 3.0 \text{ ns}$ | 15 pF, 50 pF | $t_{PLH}, t_{PHL}$ |
| 74AHCT273-Q100 | 3.0 V    | $\leq 3.0 \text{ ns}$ | 15 pF, 50 pF | $t_{PLH}, t_{PHL}$ |

12. Package outline

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

SOT163-1

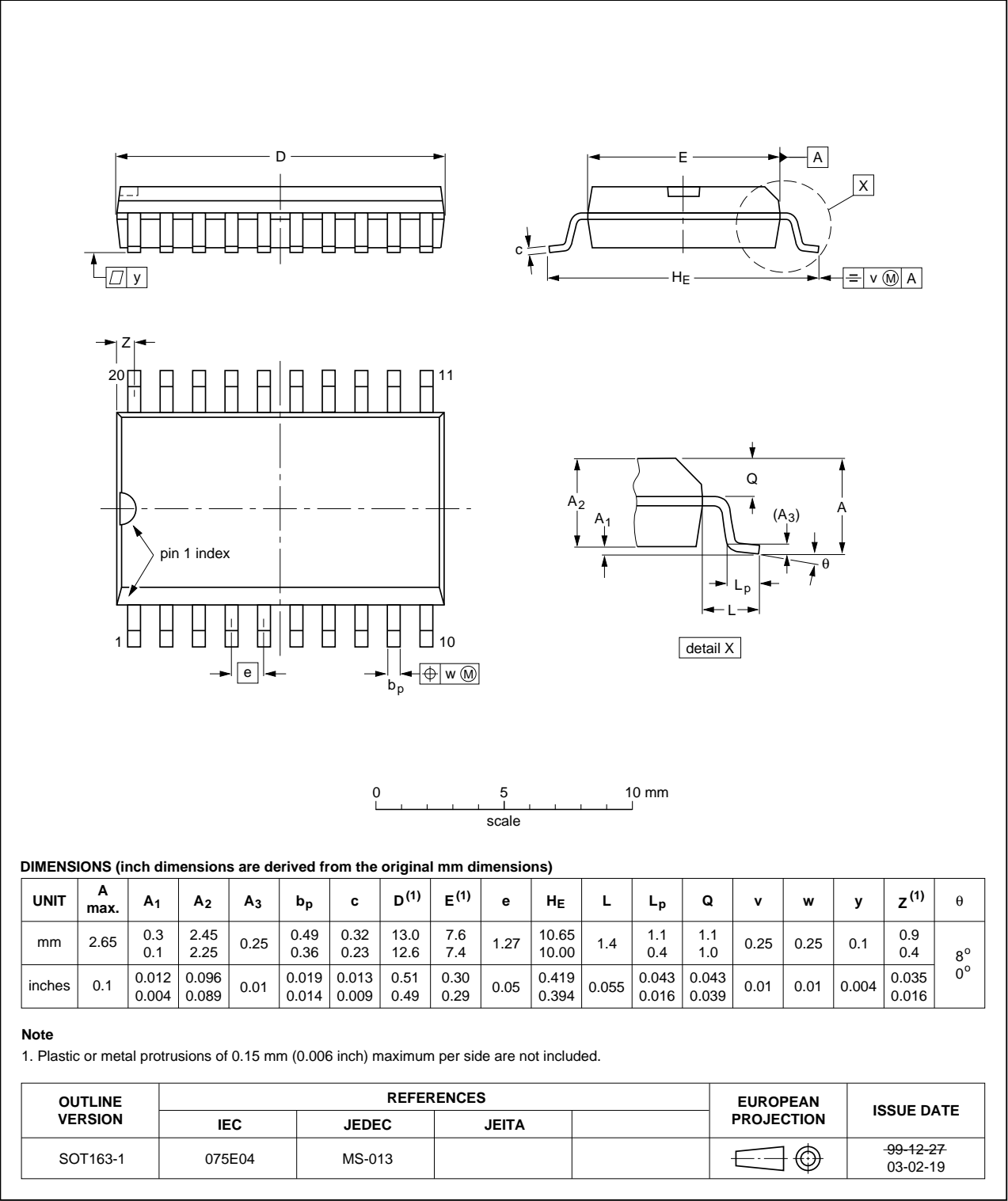


Fig 11. Package outline SOT163-1 (SO20)

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

SOT360-1

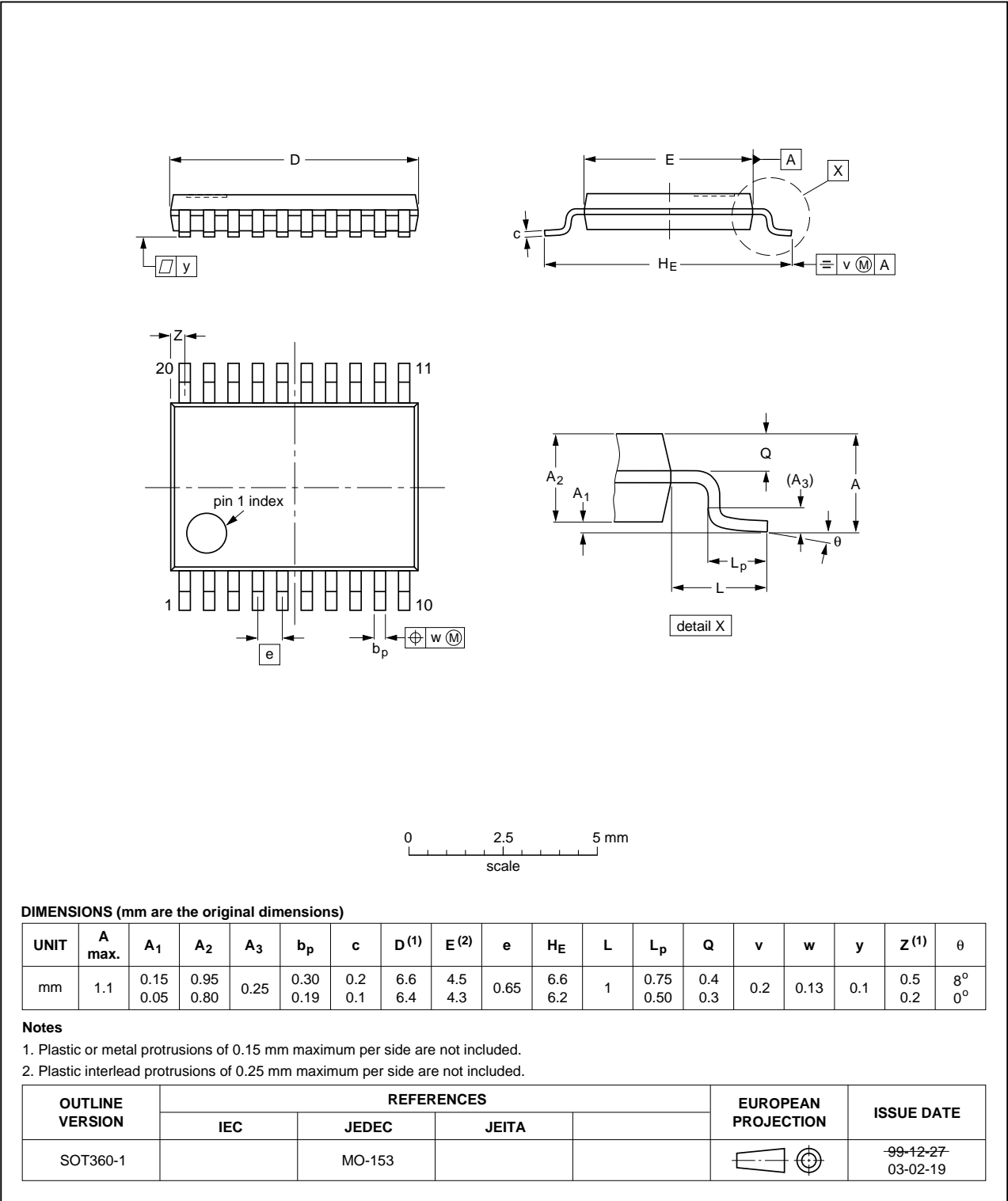


Fig 12. Package outline SOT360-1 (TSSOP20)

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

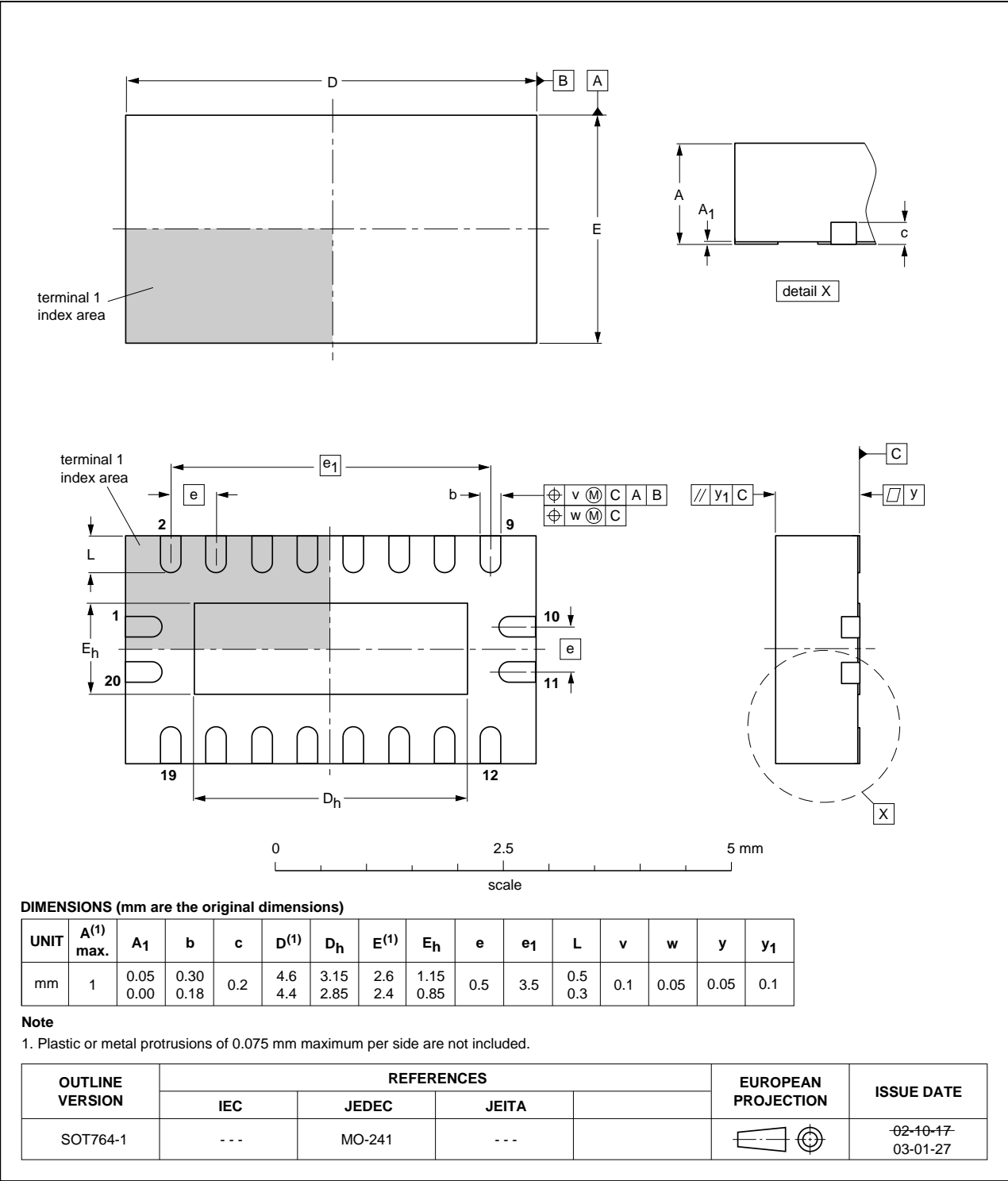


Fig 13. Package outline SOT764-1 (DHVQFN20)

## 13. Abbreviations

**Table 10. Abbreviations**

| Acronym | Description                                    |
|---------|--|
| CDM     | Charged Device Model                           |
| CMOS    | Complementary Metal-Oxide Semiconductor        |
| DUT     | Device Under Test                              |
| ESD     | ElectroStatic Discharge                        |
| HBM     | Human Body Model                               |
| LSTTL   | Low-power Schottky Transistor-Transistor Logic |
| MM      | Machine Model                                  |
| MIL     | Military                                       |
| MOS     | Metal-Oxide Semiconductor                      |

## 14. Revision history

**Table 11. Revision history**

| Document ID            | Release date | Data sheet status  | Change notice | Supersedes |
|------------------------|--------------|--------------------|---------------|------------|
| 74AHC_AHCT273_Q100 v.1 | 20130327     | 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.                                     |

[1] Please consult the most recently issued document before initiating or completing a design.

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

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Date of release: 27 March 2013

Document identifier: 74AHC\_AHCT273\_Q100