# 74HC373-Q100; 74HCT373-Q100

## Octal D-type transparent latch; 3-state

Rev. 1 — 10 August 2012 Product data sheet

## 1. General description

The 74HC373-Q100; 74HCT373-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 74HC373-Q100; 74HCT373-Q100 is an octal D-type transparent latch featuring separate D-type inputs for each latch and 3-state outputs for bus-oriented applications. A latch enable (LE) input and an output enable ($\overline{OE}$) input are common to all latches.

The 74HC373-Q100; 74HCT373-Q100 consists of eight D-type transparent latches with 3-state true outputs. When LE is HIGH, data at the Dn inputs enters the latches. In this condition the latches are transparent, i.e. a latch output changes state each time its corresponding D input changes.

When LE is LOW, the latches store the information that was present at the D inputs a set-up time preceding the HIGH-to-LOW transition of LE. When $\overline{OE}$ is LOW, the contents of the 8 latches are available at the outputs. When $\overline{OE}$ is HIGH, the outputs go to the high-impedance OFF-state. Operation of the $\overline{OE}$ input does not affect the state of the latches.

The 74HC373-Q100; 74HCT373-Q100 is functionally identical to:

- 74HC573-Q100; 74HCT573-Q100: but different pin arrangement

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 °C to +85 °C and from −40 °C to +125 °C
- Input levels:
  - For 74HC373-Q100: CMOS level
  - For 74HCT373-Q100: TTL level
- 3-state non-inverting outputs for bus-oriented applications
- Common 3-state output enable input
- Functionally identical to the 74HC573-Q100; 74HCT573-Q100
- 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 pF, R = 0 Ω)
- Multiple package options

## 3. Ordering information

**Table 1. Ordering information**

| Type number | Package | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| 74HC373D-Q100 | –40 °C to +125 °C | SO20 | plastic small outline package; 20 leads; body width 7.5 mm | SOT163-1 |
| 74HCT373D-Q100 | | | | |
| 74HC373PW-Q100 | –40 °C to +125 °C | TSSOP20 | plastic thin shrink small outline package; 20 leads; body width 4.4 mm | SOT360-1 |
| 74HCT373PW-Q100 | | | | |
| 74HC373BQ-Q100 | –40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 × 4.5 × 0.85 mm | SOT764-1 |
| 74HCT373BQ-Q100 | | | | |

## 4. Functional diagram

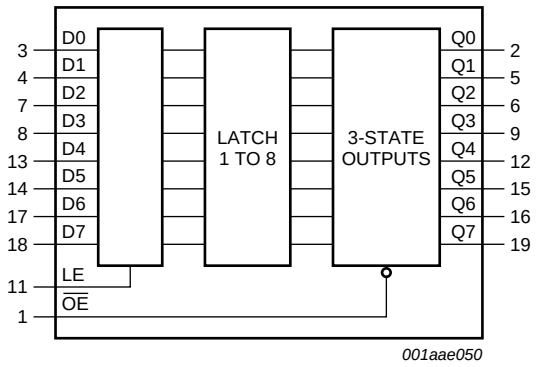



**Fig 1. Functional diagram**

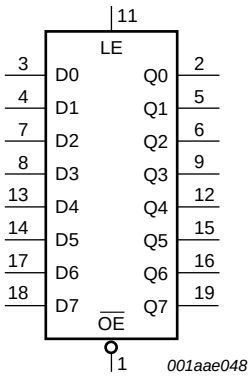



**Fig 2. Logic symbol**

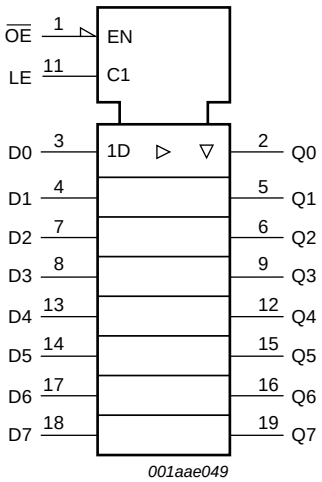



**Fig 3. IEC logic symbol**

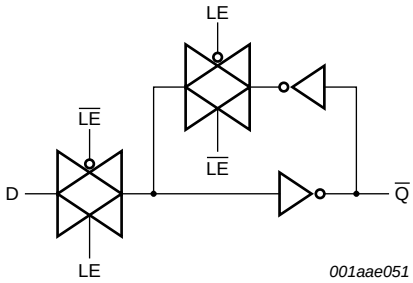



**Fig 4. Logic diagram (one latch)**

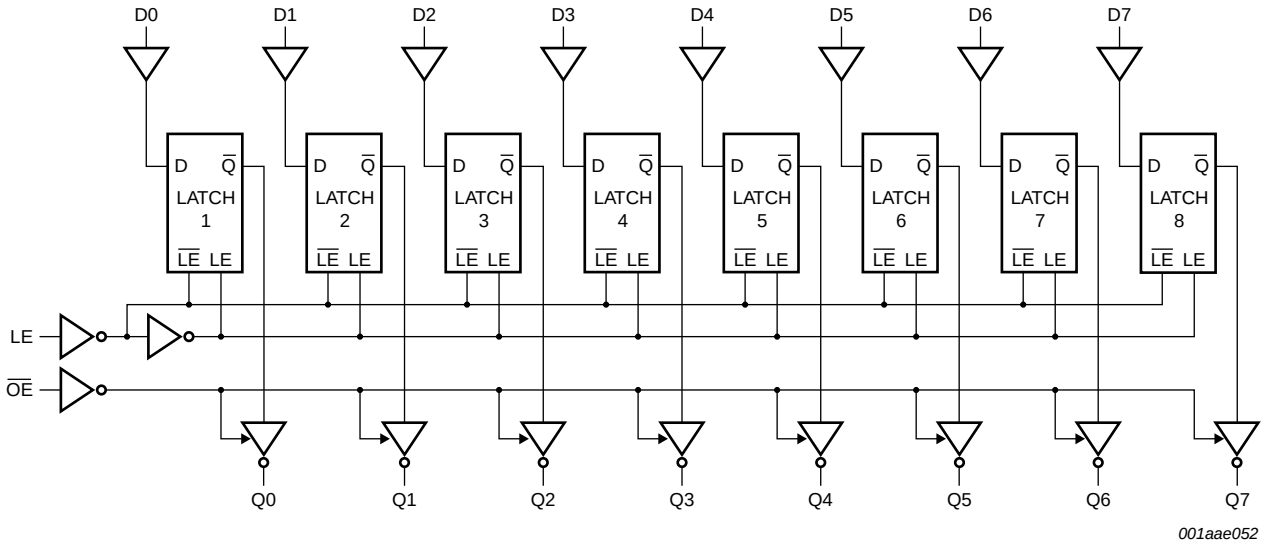



**Fig 5. Logic diagram**

# 5. Pinning information

## 5.1 Pinning

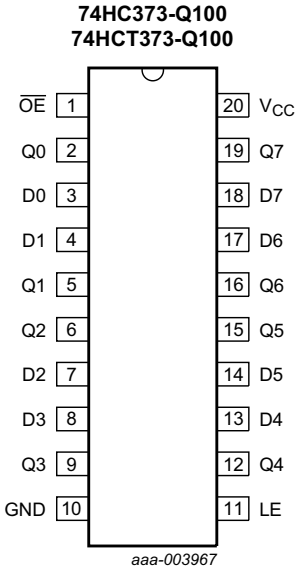
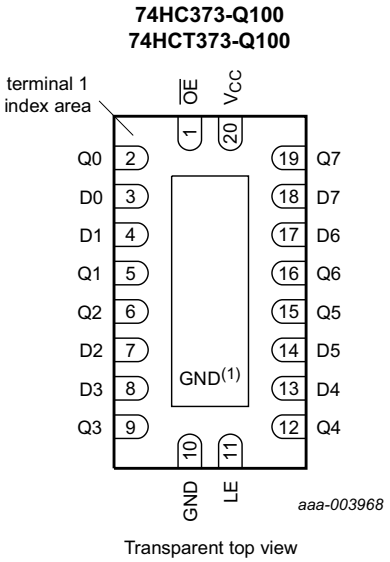



Fig 6. Pin configuration SO20 and TSSOP20




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

Fig 7. Pin configuration DHVQFN20

## 5.2 Pin description

Table 2. Pin description

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

# 6. Functional description

## 6.1 Function table

**Table 3. Function table[1]**

| Operating mode | Control | | Input | Internal latches | Output |
|---|---|---|---|---|---|
| | $\overline{OE}$ | LE | Dn | | Qn |
| Enable and read register (transparent mode) | L | H | L | L | L |
| | | | H | H | H |
| Latch and read register | L | L | l | L | L |
| | | | h | H | H |
| Latch register and disable outputs | H | X | X | X | Z |

[1] H = HIGH voltage level;
h = HIGH voltage level one set-up time prior to the HIGH-to-LOW LE transition;
L = LOW voltage level;
l = LOW voltage level one set-up time prior to the HIGH-to-LOW LE transition;
X = don't care;
Z = high-impedance OFF-state.

# 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 | V |
| $I_{IK}$ | input clamping current | $V_I < –0.5$ V or $V_I > V_{CC} + 0.5$ V | | - | ±20 | mA |
| $I_{OK}$ | output clamping current | $V_O < –0.5$ V or $V_O > V_{CC} + 0.5$ V | | - | ±20 | mA |
| $I_O$ | output current | $V_O = –0.5$ V to $(V_{CC} + 0.5$ V) | | - | ±35 | mA |
| $I_{CC}$ | supply current | | | - | +70 | mA |
| $I_{GND}$ | ground current | | | - | –70 | mA |
| $T_{stg}$ | storage temperature | | | –65 | +150 | °C |
| $P_{tot}$ | total power dissipation | SO20 package | [1] | - | 500 | mW |
| | | TSSOP20 package | [2] | | 500 | mW |
| | | DHVQFN20 package | [3] | - | 500 | mW |

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

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

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

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

*Voltages are referenced to GND (ground = 0 V)*

| Symbol | Parameter | Conditions | 74HC373-Q100 | | | 74HCT373-Q100 | | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | Min | Typ | Max | |
| $V_{CC}$ | supply voltage | | 2.0 | 5.0 | 6.0 | 4.5 | 5.0 | 5.5 | V |
| $V_I$ | input voltage | | 0 | - | $V_{CC}$ | 0 | - | $V_{CC}$ | V |
| $V_O$ | output voltage | | 0 | - | $V_{CC}$ | 0 | - | $V_{CC}$ | V |
| $T_{amb}$ | ambient temperature | | –40 | +25 | +125 | –40 | +25 | +125 | °C |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC}$ = 2.0 V | - | - | 625 | - | - | - | ns/V |
| | | $V_{CC}$ = 4.5 V | - | 1.67 | 139 | - | 1.67 | 139 | ns/V |
| | | $V_{CC}$ = 6.0 V | - | - | 83 | - | - | - | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics 74HC373-Q100**

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **$T_{amb}$ = 25 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$ = 2.0 V | 1.5 | 1.2 | - | V |
| | | $V_{CC}$ = 4.5 V | 3.15 | 2.4 | - | V |
| | | $V_{CC}$ = 6.0 V | 4.2 | 3.2 | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$ = 2.0 V | - | 0.8 | 0.5 | V |
| | | $V_{CC}$ = 4.5 V | - | 2.1 | 1.35 | V |
| | | $V_{CC}$ = 6.0 V | - | 2.8 | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | - | - | - | |
| | | $I_O$ = –20 μA; $V_{CC}$ = 2.0 V | 1.9 | 2.0 | - | V |
| | | $I_O$ = –20 μA; $V_{CC}$ = 4.5 V | 4.4 | 4.5 | - | V |
| | | $I_O$ = –20 μA; $V_{CC}$ = 6.0 V | 5.9 | 6.0 | - | V |
| | | $I_O$ = –6.0 mA; $V_{CC}$ = 4.5 V | 3.98 | 4.32 | - | V |
| | | $I_O$ = –7.8 mA; $V_{CC}$ = 6.0 V | 5.48 | 5.81 | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = 20 μA; $V_{CC}$ = 2.0 V | - | 0 | 0.1 | V |
| | | $I_O$ = 20 μA; $V_{CC}$ = 4.5 V | - | 0 | 0.1 | V |
| | | $I_O$ = 20 μA; $V_{CC}$ = 6.0 V | - | 0 | 0.1 | V |
| | | $I_O$ = 6.0 mA; $V_{CC}$ = 4.5 V | - | 0.15 | 0.26 | V |
| | | $I_O$ = 7.8 mA; $V_{CC}$ = 6.0 V | - | 0.16 | 0.26 | V |
| $I_I$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC}$ = 6.0 V | - | - | ±0.1 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 6.0 V; $V_O = V_{CC}$ or GND | - | - | ±0.5 | μA |
| $I_{CC}$ | supply current | $V_{CC}$ = 6.0 V; $I_O$ = 0 A; $V_I = V_{CC}$ or GND | - | - | 8.0 | μA |
| $C_I$ | input capacitance | | - | 3.5 | - | pF |

**Table 6. Static characteristics 74HC373-Q100** *...continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **$T_{amb}$ = –40 °C to +85 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$ = 2.0 V | 1.5 | - | - | V |
| | | $V_{CC}$ = 4.5 V | 3.15 | - | - | V |
| | | $V_{CC}$ = 6.0 V | 4.2 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$ = 2.0 V | - | - | 0.5 | V |
| | | $V_{CC}$ = 4.5 V | - | - | 1.35 | V |
| | | $V_{CC}$ = 6.0 V | - | - | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = –20 μA; $V_{CC}$ = 2.0 V | 1.9 | - | - | V |
| | | $I_O$ = –20 μA; $V_{CC}$ = 4.5 V | 4.4 | - | - | V |
| | | $I_O$ = –20 μA; $V_{CC}$ = 6.0 V | 5.9 | - | - | V |
| | | $I_O$ = –6.0 mA; $V_{CC}$ = 4.5 V | 3.84 | - | - | V |
| | | $I_O$ = –7.8 mA; $V_{CC}$ = 6.0 V | 5.34 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = 20 μA; $V_{CC}$ = 2.0 V | - | - | 0.1 | V |
| | | $I_O$ = 20 μA; $V_{CC}$ = 4.5 V | - | - | 0.1 | V |
| | | $I_O$ = 20 μA; $V_{CC}$ = 6.0 V | - | - | 0.1 | V |
| | | $I_O$ = 6.0 mA; $V_{CC}$ = 4.5 V | - | - | 0.33 | V |
| | | $I_O$ = 7.8 mA; $V_{CC}$ = 6.0 V | - | - | 0.33 | V |
| $I_I$ | input leakage current | $V_I$ = $V_{CC}$ or GND; $V_{CC}$ = 6.0 V | - | - | ±1.0 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_{CC}$ = 6.0 V; $V_O$ = $V_{CC}$ or GND | - | - | ±5.0 | μA |
| $I_{CC}$ | supply current | $V_{CC}$ = 6.0 V; $I_O$ = 0 A; $V_I$ = $V_{CC}$ or GND | | - | 80 | μA |
| **$T_{amb}$ = –40 °C to +125 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$ = 2.0 V | 1.5 | - | - | V |
| | | $V_{CC}$ = 4.5 V | 3.15 | - | - | V |
| | | $V_{CC}$ = 6.0 V | 4.2 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$ = 2.0 V | - | - | 0.5 | V |
| | | $V_{CC}$ = 4.5 V | - | - | 1.35 | V |
| | | $V_{CC}$ = 6.0 V | - | - | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = –20 μA; $V_{CC}$ = 2.0 V | 1.9 | - | - | V |
| | | $I_O$ = –20 μA; $V_{CC}$ = 4.5 V | 4.4 | - | - | V |
| | | $I_O$ = –20 μA; $V_{CC}$ = 6.0 V | 5.9 | - | - | V |
| | | $I_O$ = –6.0 mA; $V_{CC}$ = 4.5 V | 3.7 | - | - | V |
| | | $I_O$ = –7.8 mA; $V_{CC}$ = 6.0 V | 5.2 | - | - | V |

**Table 6. Static characteristics 74HC373-Q100** *...continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = 20 μA; $V_{CC}$ = 2.0 V | - | - | 0.1 | V |
| | | $I_O$ = 20 μA; $V_{CC}$ = 4.5 V | - | - | 0.1 | V |
| | | $I_O$ = 20 μA; $V_{CC}$ = 6.0 V | - | - | 0.1 | V |
| | | $I_O$ = 6.0 mA; $V_{CC}$ = 4.5 V | - | - | 0.4 | V |
| | | $I_O$ = 7.8 mA; $V_{CC}$ = 6.0 V | - | - | 0.4 | V |
| $I_I$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC}$ = 6.0 V | - | - | ±1.0 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 6.0 V; $V_O = V_{CC}$ or GND | - | - | ±10.0 | μA |
| $I_{CC}$ | supply current | $V_{CC}$ = 6.0 V; $I_O$ = 0 A; $V_I = V_{CC}$ or GND | - | - | 160 | μA |

**Table 7. Static characteristics 74HCT373-Q100**

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **$T_{amb}$ = 25 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$ = 4.5 V to 5.5 V | 2.0 | 1.6 | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$ = 4.5 V to 5.5 V | - | 1.2 | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = −20 μA; $V_{CC}$ = 4.5 V | 4.4 | 4.5 | - | V |
| | | $I_O$ = −6.0 mA; $V_{CC}$ = 4.5 V | 3.98 | 4.32 | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = 20 μA; $V_{CC}$ = 4.5 V | - | 0.0 | 0.1 | V |
| | | $I_O$ = 6.0 mA; $V_{CC}$ = 4.5 V | - | 0.16 | 0.26 | V |
| $I_I$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC}$ = 5.5 V | - | - | ±0.1 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 5.5 V; $V_O = V_{CC}$ or GND per input pin; other inputs at $V_{CC}$ or GND; $I_O$ = 0 A | - | - | ±0.5 | μA |
| $I_{CC}$ | supply current | $V_I = V_{CC}$ or GND; $I_O$ = 0 A; $V_{CC}$ = 5.5 V | - | - | 8.0 | μA |
| $\Delta I_{CC}$ | additional supply current | $V_I = V_{CC}$ − 2.1 V; other inputs at $V_{CC}$ or GND; $V_{CC}$ = 4.5 V to 5.5 V; $I_O$ = 0 A | | | | |
| | | Dn | - | 30 | 108 | μA |
| | | LE | - | 150 | 540 | μA |
| | | $\overline{OE}$ | - | 100 | 360 | μA |
| $C_I$ | input capacitance | | - | 3.5 | - | pF |
| **$T_{amb}$ = −40 °C to +85 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$ = 4.5 V to 5.5 V | 2.0 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$ = 4.5 V to 5.5 V | - | - | 0.8 | V |

**Table 7. Static characteristics 74HCT373-Q100** *...continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O = -20$ μA; $V_{CC} = 4.5$ V | 4.4 | - | - | V |
| | | $I_O = -6.0$ μA; $V_{CC} = 4.5$ V | 3.84 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O = 20$ μA; $V_{CC} = 4.5$ V | - | - | 0.1 | V |
| | | $I_O = 6.0$ mA; $V_{CC} = 4.5$ V | - | - | 0.33 | V |
| $I_I$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC} = 5.5$ V | - | - | ±1.0 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC} = 5.5$ V; $V_O = V_{CC}$ or GND per input pin; other inputs at $V_{CC}$ or GND; $I_O = 0$ A | - | - | ±5.0 | μA |
| $I_{CC}$ | supply current | $V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V | - | - | 80 | μA |
| $\Delta I_{CC}$ | additional supply current | $V_I = V_{CC} - 2.1$ V; other inputs at $V_{CC}$ or GND; $V_{CC} = 4.5$ V to 5.5 V; $I_O = 0$ A | | | | |
| | | Dn | - | - | 135 | μA |
| | | LE | - | - | 675 | μA |
| | | $\overline{OE}$ | - | - | 450 | μA |
| **$T_{amb} = -40$ °C to +125 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC} = 4.5$ V to 5.5 V | 2.0 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC} = 4.5$ V to 5.5 V | - | - | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O = -20$ μA; $V_{CC} = 4.5$ V | 4.4 | - | - | V |
| | | $I_O = -6.0$ mA; $V_{CC} = 4.5$ V | 3.7 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O = 20$ μA; $V_{CC} = 4.5$ V | - | - | 0.1 | V |
| | | $I_O = 6.0$ mA; $V_{CC} = 4.5$ V | - | - | 0.4 | V |
| $I_I$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC} = 5.5$ V | - | - | ±1.0 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC} = 5.5$ V; $V_O = V_{CC}$ or GND per input pin; other inputs at $V_{CC}$ or GND; $I_O = 0$ A | - | - | ±10 | μA |
| $I_{CC}$ | supply current | $V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V | - | - | 160 | μA |
| $\Delta I_{CC}$ | additional supply current | $V_I = V_{CC} - 2.1$ V; other inputs at $V_{CC}$ or GND; $V_{CC} = 4.5$ V to 5.5 V; $I_O = 0$ A | | | | |
| | | Dn | - | - | 147 | μA |
| | | LE | - | - | 735 | μA |
| | | $\overline{OE}$ | - | - | 490 | μA |

## 10. Dynamic characteristics

**Table 8. Dynamic characteristics 74HC373-Q100**

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

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **$T_{amb}$ = 25 °C** | | | | | | | |
| $t_{pd}$ | propagation delay | Dn to Qn; see Figure 8 | [1] | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 41 | 150 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 15 | 30 | ns |
| | | $V_{CC}$ = 5 V; $C_L$ = 15 pF | | - | 12 | - | ns |
| | | $V_{CC}$ = 6.0 V | | - | 12 | 26 | ns |
| | | LE to Qn; see Figure 9 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 50 | 175 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 18 | 35 | ns |
| | | $V_{CC}$ = 5 V; $C_L$ = 15 pF | | - | 15 | - | ns |
| | | $V_{CC}$ = 6.0 V | | - | 14 | 30 | ns |
| $t_{en}$ | enable time | $\overline{OE}$ to Qn; see Figure 10 | [2] | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 44 | 150 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 16 | 30 | ns |
| | | $V_{CC}$ = 6.0 V | | - | 13 | 26 | ns |
| $t_{dis}$ | disable time | $\overline{OE}$ to Qn; see Figure 10 | [3] | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 47 | 150 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 17 | 30 | ns |
| | | $V_{CC}$ = 6.0 V | | - | 14 | 26 | ns |
| $t_t$ | transition time | Qn; see Figure 8 and Figure 9 | [4] | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 14 | 60 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 5 | 12 | ns |
| | | $V_{CC}$ = 6.0 V | | - | 4 | 10 | ns |
| $t_W$ | pulse width | LE HIGH; see Figure 9 | | | | | |
| | | $V_{CC}$ = 2.0 V | | 80 | 17 | - | ns |
| | | $V_{CC}$ = 4.5 V | | 16 | 6 | - | ns |
| | | $V_{CC}$ = 6.0 V | | 14 | 5 | - | ns |
| $t_{su}$ | set-up time | Dn to LE; see Figure 11 | | | | | |
| | | $V_{CC}$ = 2.0 V | | 50 | 14 | - | ns |
| | | $V_{CC}$ = 4.5 V | | 10 | 5 | - | ns |
| | | $V_{CC}$ = 6.0 V | | 9 | 4 | - | ns |
| $t_h$ | hold time | Dn to LE; see Figure 11 | | | | | |
| | | $V_{CC}$ = 2.0 V | | +5 | –8 | - | ns |
| | | $V_{CC}$ = 4.5 V | | +5 | –3 | - | ns |
| | | $V_{CC}$ = 6.0 V | | +5 | –2 | - | ns |
| $C_{PD}$ | power dissipation capacitance | per latch; $V_I$ = GND to $V_{CC}$ | [5] | - | 45 | - | pF |

**Table 8. Dynamic characteristics 74HC373-Q100** *…continued*

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

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

**Table 8. Dynamic characteristics 74HC373-Q100** *…continued*

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

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

**Table 8. Dynamic characteristics 74HC373-Q100** *…continued*

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

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

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

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

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

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

[5] $C_{PD}$ is used to determine the dynamic power dissipation ($P_D$ in μW).
$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ where:
$f_i$ = input frequency in MHz;
$f_o$ = output frequency in MHz;
$C_L$ = output load capacitance in pF;
$V_{CC}$ = supply voltage in V;
N = number of inputs switching;
$\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

**Table 9. Dynamic characteristics 74HCT373-Q100**

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

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

**Table 9. Dynamic characteristics 74HCT373-Q100** *...continued*

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

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

**Table 9. Dynamic characteristics 74HCT373-Q100** *...continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $t_h$ | hold time Dn to LE | Dn to LE; see Figure 11 | | | | |
| | | $V_{CC}$ = 4.5 V | 4 | - | - | ns |

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

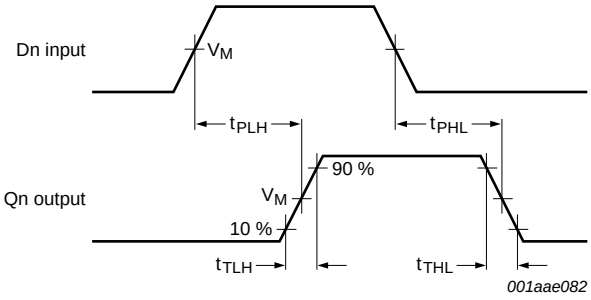
[2] $t_{en}$ is the same as $t_{PZH}$ and $t_{PZL}$.

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

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

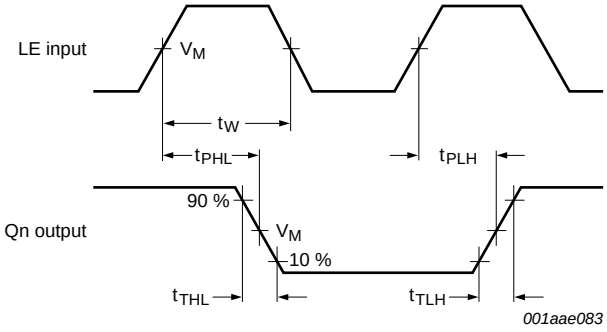
[5] $C_{PD}$ is used to determine the dynamic power dissipation ($P_D$ in μW).
$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ where:
$f_i$ = input frequency in MHz;
$f_o$ = output frequency in MHz;
$C_L$ = output load capacitance in pF;
$V_{CC}$ = supply voltage in V;
N = number of inputs switching;
$\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

## 11. Waveforms



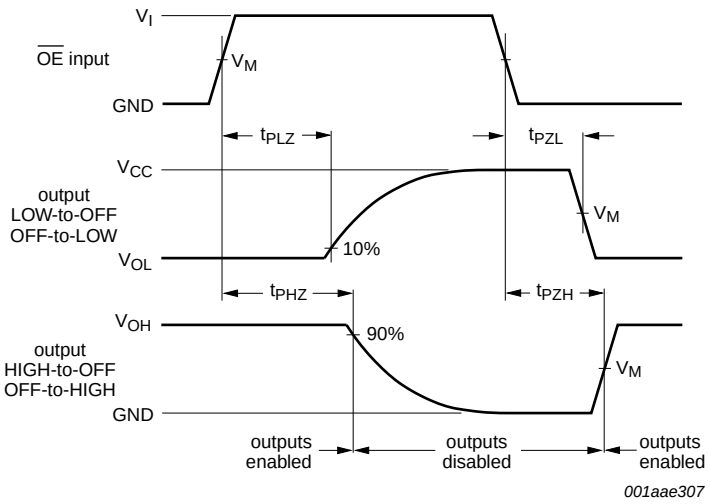

Measurement points are given in Table 10.

**Fig 8. Propagation delay input (Dn) to output (Qn) and transition time output (Qn)**



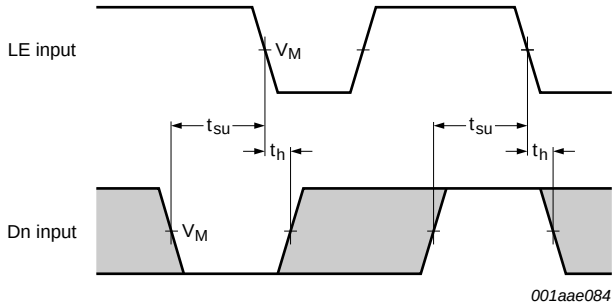

Measurement points are given in Table 10.

**Fig 9. Pulse width latch enable input (LE), propagation delay (LE) to output (Qn) and transition time output (Qn)**




Measurement points are given in Table 10.

**Fig 10. 3-state enable and disable time**

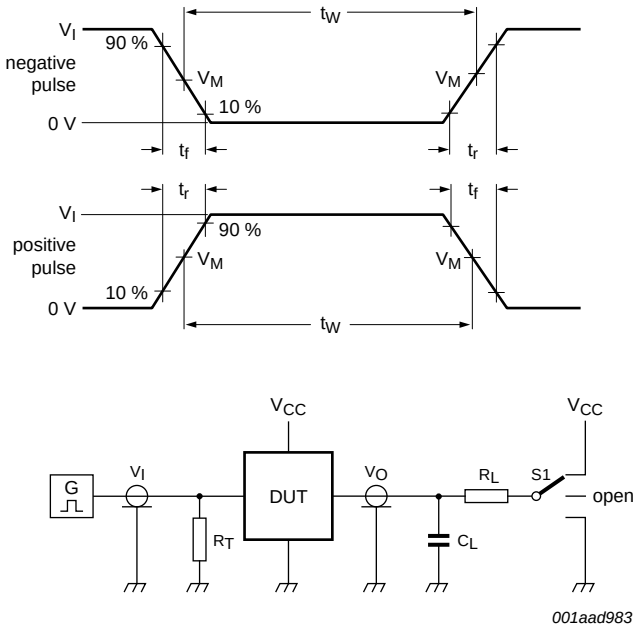



Measurement points are given in Table 10.

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

**Table 10. Measurement points**

| Type | Input | Output |
|---|---|---|
| | $V_M$ | $V_M$ |
| 74HC373-Q100 | $0.5V_{CC}$ | $0.5V_{CC}$ |
| 74HCT373-Q100 | 1.3 V | 1.3 V |




Test data is given in Table 11.

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

$R_L$ = Load resistor

S1 = Test selection switch

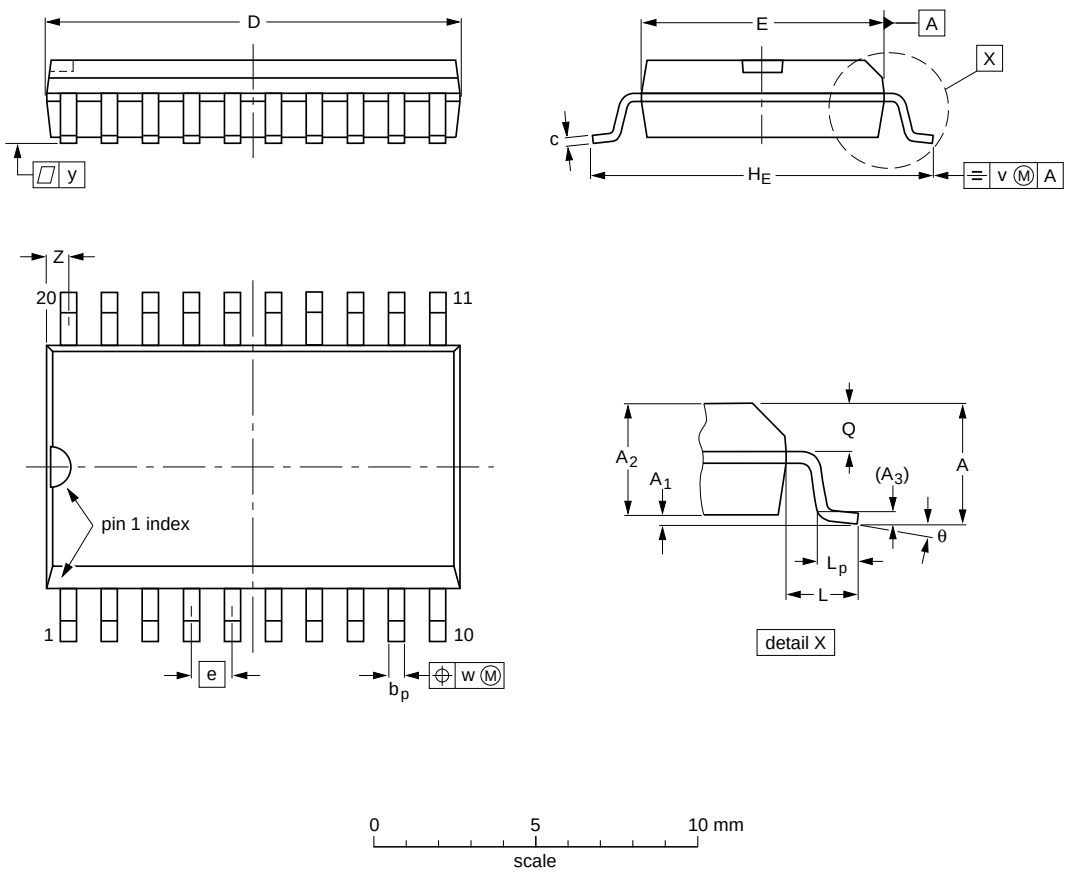
**Fig 12. Test circuit for measuring switching times**

**Table 11. Test data**

| Type | Input | | Load | | S1 position | | |
|---|---|---|---|---|---|---|---|
| | $V_I$ | $t_r$, $t_f$ | $C_L$ | $R_L$ | $t_{PHL}$, $t_{PLH}$ | $t_{PZH}$, $t_{PHZ}$ | $t_{PZL}$, $t_{PLZ}$ |
| 74HC373-Q100 | $V_{CC}$ | 6 ns | 15 pF, 50 pF | 1 kΩ | open | GND | $V_{CC}$ |
| 74HCT373-Q100 | 3 V | 6 ns | 15 pF, 50 pF | 1 kΩ | open | GND | $V_{CC}$ |

## 12. Package outline

**SO20: plastic small outline package; 20 leads; body width 7.5 mm** **SOT163-1**




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

| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | D (1) | E (1) | e | $H_E$ | L | $L_p$ | Q | v | w | y | Z (1) | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 2.65 | 0.3<br>0.1 | 2.45<br>2.25 | 0.25 | 0.49<br>0.36 | 0.32<br>0.23 | 13.0<br>12.6 | 7.6<br>7.4 | 1.27 | 10.65<br>10.00 | 1.4 | 1.1<br>0.4 | 1.1<br>1.0 | 0.25 | 0.25 | 0.1 | 0.9<br>0.4 | $8^o$<br>$0^o$ |
| inches | 0.1 | 0.012<br>0.004 | 0.096<br>0.089 | 0.01 | 0.019<br>0.014 | 0.013<br>0.009 | 0.51<br>0.49 | 0.30<br>0.29 | 0.05 | 0.419<br>0.394 | 0.055 | 0.043<br>0.016 | 0.043<br>0.039 | 0.01 | 0.01 | 0.004 | 0.035<br>0.016 | |

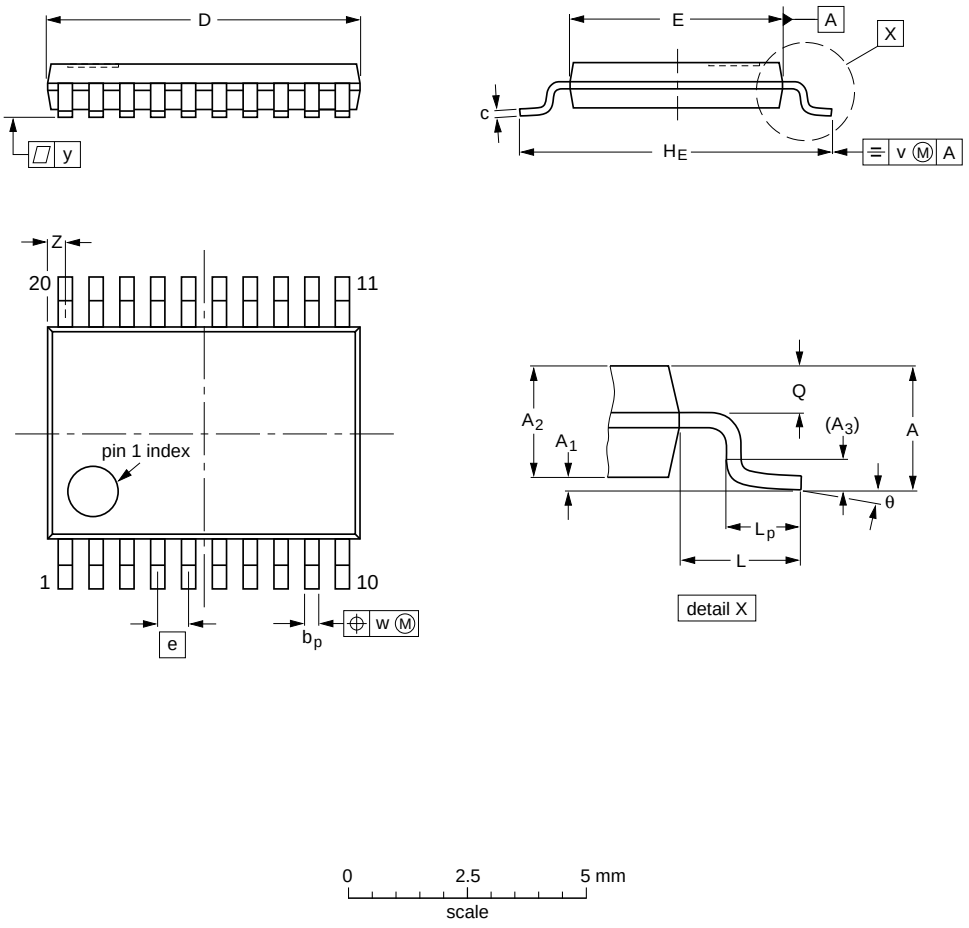
**Note**

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

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

**Fig 13. Package outline SOT163-1 (SO20)**

**TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm** **SOT360-1**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | D (1) | E (2) | e | $H_E$ | L | $L_p$ | Q | v | w | y | Z (1) | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1 | 0.15<br>0.05 | 0.95<br>0.80 | 0.25 | 0.30<br>0.19 | 0.2<br>0.1 | 6.6<br>6.4 | 4.5<br>4.3 | 0.65 | 6.6<br>6.2 | 1 | 0.75<br>0.50 | 0.4<br>0.3 | 0.2 | 0.13 | 0.1 | 0.5<br>0.2 | $8^o$<br>$0^o$ |

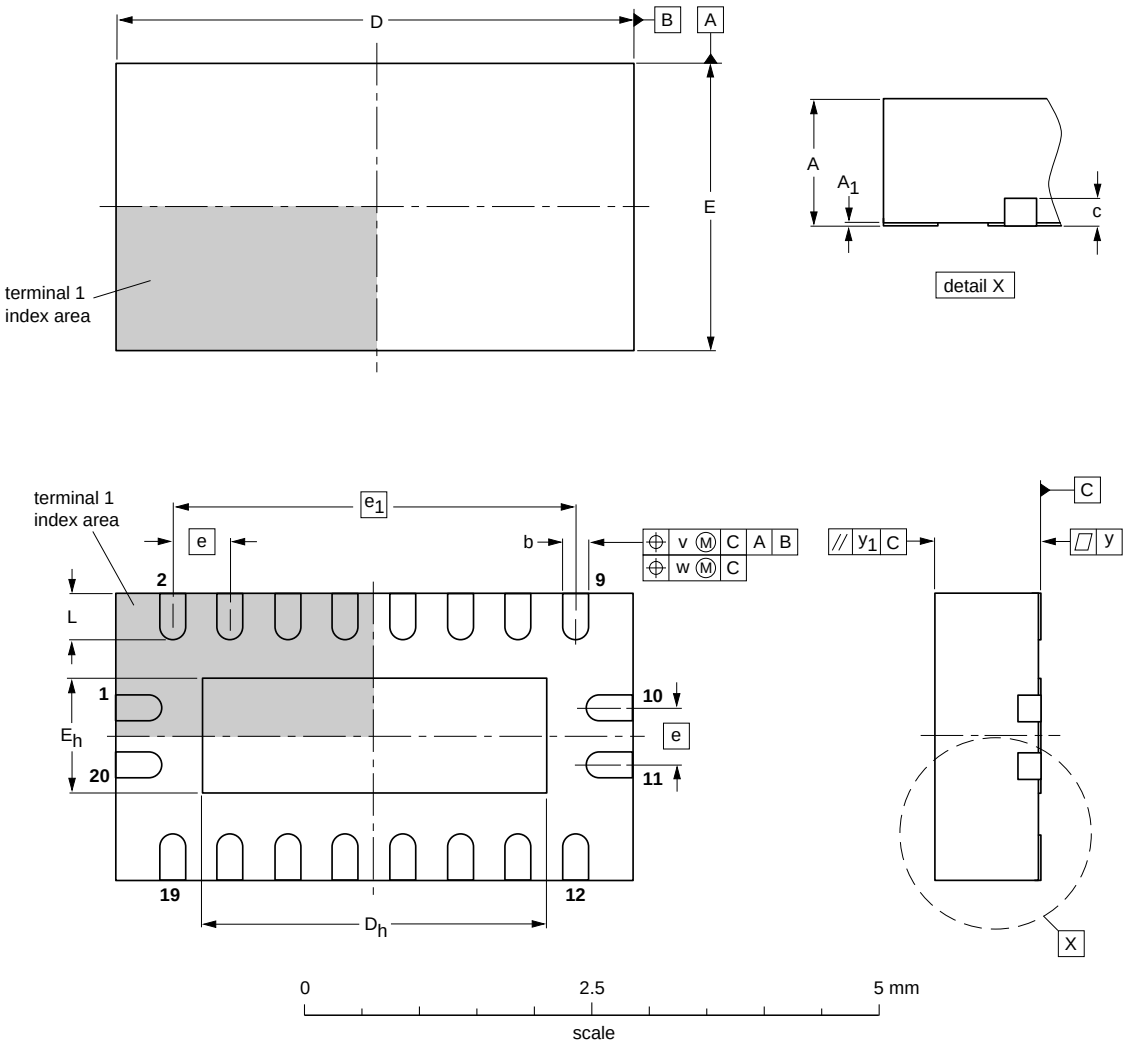
**Notes**

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT360-1 | | MO-153 | | | | ~~99-12-27~~<br>03-02-19 |

**Fig 14. 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**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A(1) max. | $A_1$ | b | c | D(1) | $D_h$ | E(1) | $E_h$ | e | $e_1$ | L | v | w | y | $y_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1 | 0.05<br>0.00 | 0.30<br>0.18 | 0.2 | 4.6<br>4.4 | 3.15<br>2.85 | 2.6<br>2.4 | 1.15<br>0.85 | 0.5 | 3.5 | 0.5<br>0.3 | 0.1 | 0.05 | 0.05 | 0.1 |

**Note**

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT764-1 | - - - | MO-241 | - - - | | | ~~02-10-17~~<br>03-01-27 |

**Fig 15. Package outline SOT764-1 (DHVQFN20)**

## 13. Abbreviations

**Table 12. Abbreviations**

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

## 14. Revision history

**Table 13. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| 74HC_HCT373_Q100 v.1 | 20120810 | Product data sheet | - | - |

# 15. Legal information

## 15.1 Data sheet status

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

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

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

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

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## 17. Contents





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Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А