# 74HC273; 74HCT273

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

Rev. 03 — 24 January 2006 Product data sheet

## 1. General description

The 74HC273; 74HCT273 is a high-speed Si-gate CMOS device and is pin compatible with Low-power Schottky TTL (LSTTL).

The 74HC273; 74HCT273 has eight edge-triggered, D-type flip-flops with individual D inputs and Q outputs. The common clock (pin CP) and master reset (pin $\overline{MR}$) 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 will be forced LOW independently of clock or data inputs by a LOW voltage level on the $\overline{MR}$ input.

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

## 2. Features

- Ideal buffer for MOS microprocessor or memory
- Common clock and master reset
- Eight positive edge-triggered D-type flip-flops
- Complies with JEDEC standard no. 7A
- ESD protection:
  - HBM EIA/JESD22-A114-C exceeds 2000 V
  - MM EIA/JESD22-A115-A exceeds 200 V
- Multiple package options
- Specified from –40 °C to +85 °C and from –40 °C to +125 °C

## 3. Quick reference data

**Table 1: Quick reference data**

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **74HC273** | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay CP to Qn | $V_{CC}$ = 5 V; $C_L$ = 15 pF | - | 15 | - | ns |
| $t_{PHL}$ | HIGH-to-LOW propagation delay $\overline{MR}$ to Qn | $V_{CC}$ = 5 V; $C_L$ = 15 pF | - | 15 | - | ns |
| $f_{max}$ | maximum input clock frequency | $V_{CC}$ = 5 V; $C_L$ = 15 pF | - | 66 | - | MHz |

PHILIPS

**Table 1: Quick reference data** *...continued*

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

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $C_i$ | input capacitance | | | - | 3.5 | - | pF |
| $C_{PD}$ | power dissipation capacitance | per flip-flop; $V_I$ = GND to $V_{CC}$ | [1] | - | 20 | - | pF |
| **74HCT273** | | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay CP to Qn | $V_{CC}$ = 5 V; $C_L$ = 15 pF | | - | 15 | - | ns |
| $t_{PHL}$ | HIGH-to-LOW propagation delay $\overline{MR}$ to Qn | $V_{CC}$ = 5 V; $C_L$ = 15 pF | | - | 20 | - | ns |
| $f_{max}$ | maximum input clock frequency | $V_{CC}$ = 5 V; $C_L$ = 15 pF | | - | 36 | - | MHz |
| $C_i$ | input capacitance | | | - | 3.5 | - | pF |
| $C_{PD}$ | power dissipation capacitance | per flip-flop; $V_I$ = GND to ($V_{CC}$ – 1.5 V) | [1] | - | 23 | - | pF |

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

## 4. Ordering information

**Table 2: Ordering information**

| Type number | Package | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| **74HC273** | | | | |
| 74HC273N | –40 °C to +125 °C | DIP20 | plastic dual in-line package; 20 leads (300 mil) | SOT146-1 |
| 74HC273D | –40 °C to +125 °C | SO20 | plastic small outline package; 20 leads; body width 7.5 mm | SOT163-1 |
| 74HC273DB | –40 °C to +125 °C | SSOP20 | plastic shrink small outline package; 20 leads; body width 5.3 mm | SOT339-1 |
| 74HC273PW | –40 °C to +125 °C | TSSOP20 | plastic thin shrink small outline package; 20 leads; body width 4.4 mm | SOT360-1 |
| 74HC273BQ | –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 |
| **74HCT273** | | | | |
| 74HCT273N | –40 °C to +125 °C | DIP20 | plastic dual in-line package; 20 leads (300 mil) | SOT146-1 |
| 74HCT273D | –40 °C to +125 °C | SO20 | plastic small outline package; 20 leads; body width 7.5 mm | SOT163-1 |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 2: Ordering information** *…continued*

| Type number | Package | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| 74HCT273DB | –40 °C to +125 °C | SSOP20 | plastic shrink small outline package; 20 leads; body width 5.3 mm | SOT339-1 |
| 74HCT273PW | –40 °C to +125 °C | TSSOP20 | plastic thin shrink small outline package; 20 leads; body width 4.4 mm | SOT360-1 |
| 74HCT273BQ | –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 |

## 5. Functional diagram

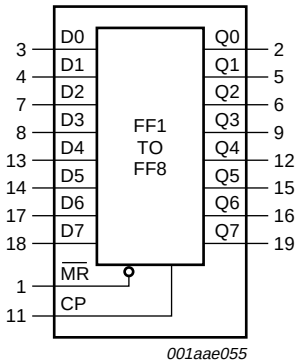



**Fig 1. Functional diagram**

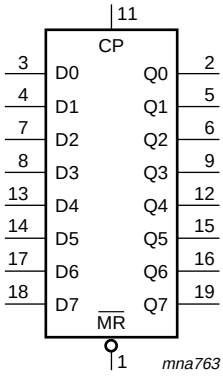



**Fig 2. Logic symbol**

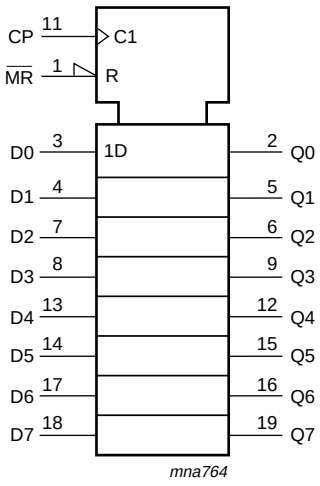



**Fig 3. IEC logic symbol**


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

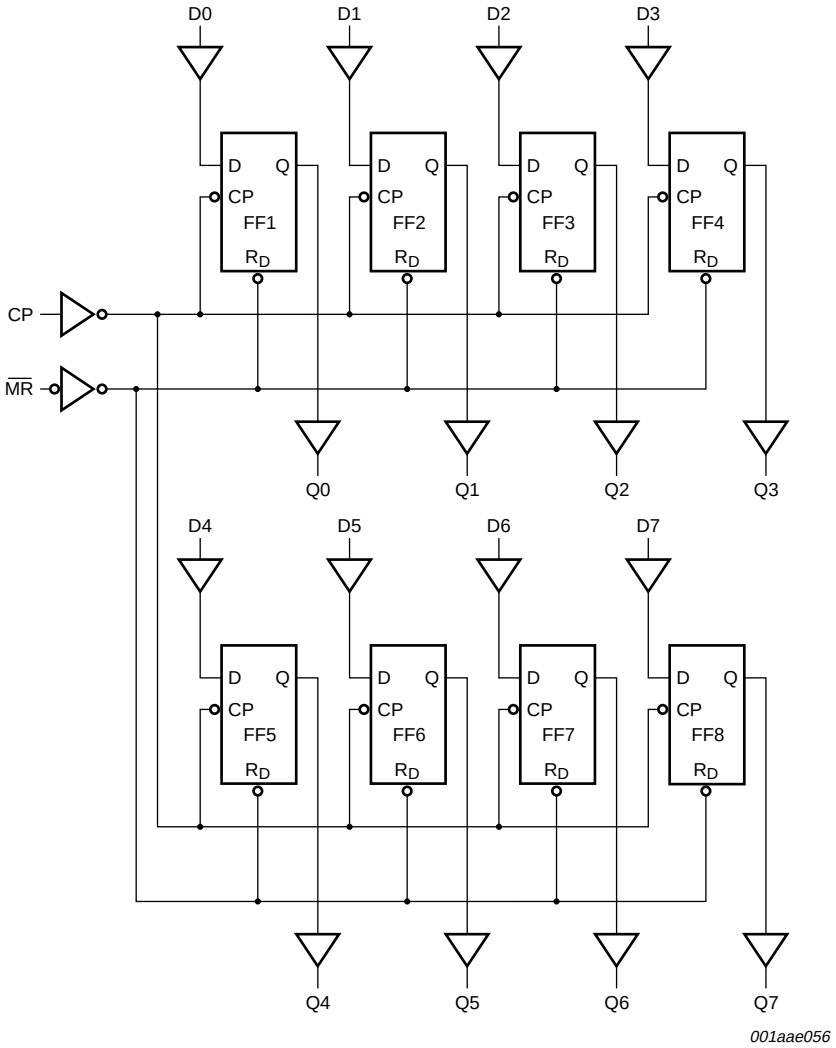



**Fig 4. Logic diagram**



© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

# 6. Pinning information

## 6.1 Pinning

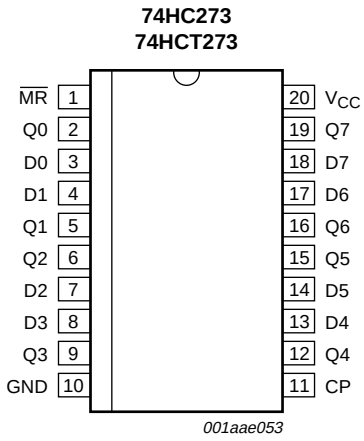
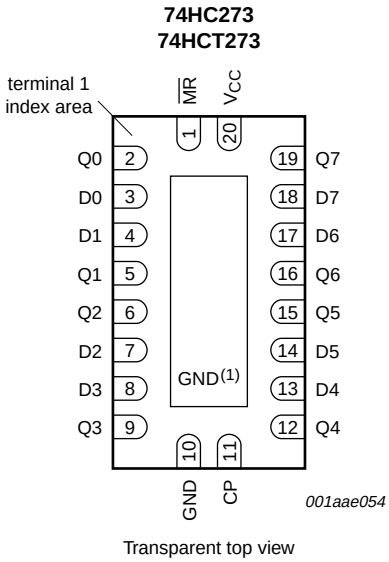



Fig 5. Pin configuration DIP20, SO20, SSOP20 and TSSOP20




Transparent top view

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

Fig 6. Pin configuration DHVQFN20

## 6.2 Pin description

Table 3: Pin description

| Symbol | Pin | Description |
|---|---|---|
| $\overline{MR}$ | 1 | master reset input (active LOW) |
| Q0 | 2 | flip-flop output 0 |
| D0 | 3 | data input 0 |
| D1 | 4 | data input 1 |
| Q1 | 5 | flip-flop output 1 |
| Q2 | 6 | flip-flop output 2 |
| D2 | 7 | data input 2 |
| D3 | 8 | data input 3 |
| Q3 | 9 | flip-flop output 3 |
| GND | 10 | ground (0 V) |
| CP | 11 | clock input (LOW-to-HIGH, edge-triggered) |
| Q4 | 12 | flip-flop output 4 |
| D4 | 13 | data input 4 |
| D5 | 14 | data input 5 |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 3: Pin description** *...continued*

| Symbol | Pin | Description |
|---|---|---|
| Q5 | 15 | flip-flop output 5 |
| Q6 | 16 | flip-flop output 6 |
| D6 | 17 | data input 6 |
| D7 | 18 | data input 7 |
| Q7 | 19 | flip-flop output 7 |
| $V_{CC}$ | 20 | supply voltage |

# 7. Functional description

## 7.1 Function table

**Table 4: Function table** [1]

| Operating modes | Control | | Input | Output |
|---|---|---|---|---|
| | $\overline{MR}$ | 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 transition;
X = don't care.

# 8. Limiting values

**Table 5: Limiting values**

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | –0.5 | +7 | V |
| $I_{IK}$ | input clamping current | $V_I < –0.5$ 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) | - | ±25 | mA |
| $I_{CC}$ | quiescent supply current | | - | 50 | mA |
| $I_{GND}$ | ground current | | - | –50 | mA |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 5: Limiting values** *…continued*

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $P_{tot}$ | total power dissipation | | | | | |
| | DIP20 package | | [1] | - | 750 | mW |
| | SO20 package | | [2] | - | 500 | mW |
| | SSOP20 package | | [3] | - | 500 | mW |
| | TSSOP20 package | | [3] | - | 500 | mW |
| | DHVQFN20 package | | [4] | - | 500 | mW |

[1] For DIP20 package: $P_{tot}$ derates linearly with 12 mW/K above 70 °C.

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

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

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

## 9. Recommended operating conditions

**Table 6: Recommended operating conditions**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **74HC273** | | | | | | |
| $V_{CC}$ | supply voltage | | 2.0 | 5.0 | 6.0 | V |
| $V_I$ | input voltage | | 0 | - | $V_{CC}$ | V |
| $V_O$ | output voltage | | 0 | - | $V_{CC}$ | V |
| $T_{amb}$ | ambient temperature | | –40 | +25 | +125 | °C |
| $t_r$, $t_f$ | input rise and fall time | $V_{CC}$ = 2.0 V | - | - | 1000 | ns |
| | | $V_{CC}$ = 4.5 V | - | 6.0 | 500 | ns |
| | | $V_{CC}$ = 6.0 V | - | - | 400 | ns |
| **74HCT273** | | | | | | |
| $V_{CC}$ | supply voltage | | 4.5 | 5.0 | 5.5 | V |
| $V_I$ | input voltage | | 0 | - | $V_{CC}$ | V |
| $V_O$ | output voltage | | 0 | - | $V_{CC}$ | V |
| $T_{amb}$ | ambient temperature | | –40 | +25 | +125 | °C |
| $t_r$, $t_f$ | input rise and fall time | $V_{CC}$ = 4.5 V | - | 6.0 | 500 | ns |

## 10. Static characteristics

**Table 7: Static characteristics 74HC273**

*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-state 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 |



© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 7: Static characteristics 74HC273** *...continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{IL}$ | LOW-state 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-state 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 |
| | | $I_O$ = –4.0 mA; $V_{CC}$ = 4.5 V | 3.98 | 4.32 | - | V |
| | | $I_O$ = –5.2 mA; $V_{CC}$ = 6.0 V | 5.48 | 5.81 | - | V |
| $V_{OL}$ | LOW-state 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 |
| | | $I_O$ = 4.0 mA; $V_{CC}$ = 4.5 V | - | 0.15 | 0.26 | V |
| | | $I_O$ = 5.2 mA; $V_{CC}$ = 6.0 V | - | 0.16 | 0.26 | V |
| $I_{LI}$ | 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 $V_{IL}$; $V_O = V_{CC}$ or GND; $V_{CC}$ = 6.0 V | - | - | ±0.5 | µA |
| $I_{CC}$ | quiescent supply current | $V_I = V_{CC}$ or GND; $I_O$ = 0 A; $V_{CC}$ = 6.0 V | - | - | 8.0 | µA |
| $C_i$ | input capacitance | | - | 3.5 | - | pF |
| **$T_{amb}$ = –40 °C to +85 °C** | | | | | | |
| $V_{IH}$ | HIGH-state 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-state 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-state 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 |
| | | $I_O$ = –4.0 mA; $V_{CC}$ = 4.5 V | 3.84 | - | - | V |
| | | $I_O$ = –5.2 mA; $V_{CC}$ = 6.0 V | 5.34 | - | - | V |
| $V_{OL}$ | LOW-state 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 |
| | | $I_O$ = 4.0 mA; $V_{CC}$ = 4.5 V | - | - | 0.33 | V |
| | | $I_O$ = 5.2 mA; $V_{CC}$ = 6.0 V | - | - | 0.33 | V |
| $I_{LI}$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC}$ = 6.0 V | - | - | ±1.0 | µA |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 7: Static characteristics 74HC273** *...continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_O = V_{CC}$ or GND; $V_{CC}$ = 6.0 V | - | - | ±5.0 | µA |
| $I_{CC}$ | quiescent supply current | $V_I = V_{CC}$ or GND; $I_O$ = 0 A; $V_{CC}$ = 6.0 V | - | - | 80 | µA |
| **$T_{amb}$ = −40 °C to +125 °C** | | | | | | |
| $V_{IH}$ | HIGH-state 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-state 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-state 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 |
| | | $I_O$ = −4.0 mA; $V_{CC}$ = 4.5 V | 3.7 | - | - | V |
| | | $I_O$ = −5.2 mA; $V_{CC}$ = 6.0 V | 5.2 | - | - | V |
| $V_{OL}$ | LOW-state 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 |
| | | $I_O$ = 4.0 mA; $V_{CC}$ = 4.5 V | - | - | 0.4 | V |
| | | $I_O$ = 5.2 mA; $V_{CC}$ = 6.0 V | - | - | 0.4 | V |
| $I_{LI}$ | 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 $V_{IL}$; $V_O = V_{CC}$ or GND; $V_{CC}$ = 6.0 V | - | - | ±10.0 | µA |
| $I_{CC}$ | quiescent supply current | $V_I = V_{CC}$ or GND; $I_O$ = 0 A; $V_{CC}$ = 6.0 V | - | - | 160 | µA |

**Table 8: Static characteristics 74HCT273**

*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-state input voltage | $V_{CC}$ = 4.5 V to 5.5 V | 2.0 | 1.6 | - | V |
| $V_{IL}$ | LOW-state input voltage | $V_{CC}$ = 4.5 V to 5.5 V | - | 1.2 | 0.8 | V |
| $V_{OH}$ | HIGH-state output voltage | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 4.5 V | | | | |
| | | $I_O$ = −20 µA | 4.4 | 4.5 | - | V |
| | | $I_O$ = −4.0 mA | 3.98 | 4.32 | - | V |
| $V_{OL}$ | LOW-state output voltage | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 4.5 V | | | | |
| | | $I_O$ = 20 µA | - | 0 | 0.1 | V |
| | | $I_O$ = 4.0 mA | - | 0.15 | 0.26 | V |
| $I_{LI}$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC}$ = 5.5 V | - | - | ±0.1 | µA |



© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 8: Static characteristics 74HCT273** *…continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{OZ}$ | 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 |
| $I_{CC}$ | quiescent supply current | $V_I = V_{CC}$ or GND; $I_O$ = 0 A; $V_{CC}$ = 5.5 V | - | - | 8.0 | µA |
| $\Delta I_{CC}$ | additional quiescent 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 | | | | |
| | pin $\overline{MR}$ | | - | 100 | 360 | µA |
| | pin CP | | - | 175 | 630 | µA |
| | pin Dn | | - | 15 | 54 | µA |
| $C_i$ | input capacitance | | - | 3.5 | - | pF |
| **$T_{amb}$ = –40 °C to +85 °C** | | | | | | |
| $V_{IH}$ | HIGH-state input voltage | $V_{CC}$ = 4.5 V to 5.5 V | 2.0 | - | - | V |
| $V_{IL}$ | LOW-state input voltage | $V_{CC}$ = 4.5 V to 5.5 V | - | - | 0.8 | V |
| $V_{OH}$ | HIGH-state output voltage | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 4.5 V | | | | |
| | | $I_O$ = –20 µA | 4.4 | - | - | V |
| | | $I_O$ = –4.0 mA | 3.84 | - | - | V |
| $V_{OL}$ | LOW-state output voltage | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 4.5 V | | | | |
| | | $I_O$ = 20 µA | - | - | 0.1 | V |
| | | $I_O$ = 4.0 mA | - | - | 0.33 | V |
| $I_{LI}$ | 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 |
| $I_{CC}$ | quiescent supply current | $V_I = V_{CC}$ or GND; $I_O$ = 0 A; $V_{CC}$ = 5.5 V | - | - | 80 | µA |
| $\Delta I_{CC}$ | additional quiescent 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 | | | | |
| | pin $\overline{MR}$ | | - | - | 450 | µA |
| | pin CP | | - | - | 787.5 | µA |
| | pin Dn | | - | - | 67.5 | µA |
| **$T_{amb}$ = –40 °C to +125 °C** | | | | | | |
| $V_{IH}$ | HIGH-state input voltage | $V_{CC}$ = 4.5 V to 5.5 V | 2.0 | - | - | V |
| $V_{IL}$ | LOW-state input voltage | $V_{CC}$ = 4.5 V to 5.5 V | - | - | 0.8 | V |
| $V_{OH}$ | HIGH-state output voltage | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 4.5 V | | | | |
| | | $I_O$ = –20 µA | 4.4 | - | - | V |
| | | $I_O$ = –4.0 mA | 3.7 | - | - | V |
| $V_{OL}$ | LOW-state output voltage | $V_I = V_{IH}$ or $V_{IL}$; $V_{CC}$ = 4.5 V | | | | |
| | | $I_O$ = 20 µA | - | - | 0.1 | V |
| | | $I_O$ = 4.0 mA | - | - | 0.4 | V |
| $I_{LI}$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC}$ = 5.5 V | - | - | ±1.0 | µA |



© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 8: Static characteristics 74HCT273** *…continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{OZ}$ | 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 |
| $I_{CC}$ | quiescent supply current | $V_I = V_{CC}$ or GND; $I_O$ = 0 A; $V_{CC}$ = 5.5 V | - | - | 160 | µA |
| $\Delta I_{CC}$ | additional quiescent 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 | | | | |
| | pin $\overline{MR}$ | | - | - | 490 | µA |
| | pin CP | | - | - | 857.5 | µA |
| | pin Dn | | - | - | 73.5 | µA |

## 11. Dynamic characteristics

**Table 9: Dynamic characteristics 74HC273**

*Voltages are referenced to GND (ground = 0 V); $t_r = t_f$ = 6 ns; $C_L$ = 50 pF unless otherwise specified; for test circuit see Figure 10.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **$T_{amb}$ = 25 °C** | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay CP to Qn | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | - | 41 | 150 | ns |
| | | $V_{CC}$ = 4.5 V | - | 15 | 30 | ns |
| | | $V_{CC}$ = 5 V; $C_L$ = 15 pF | - | 15 | - | ns |
| | | $V_{CC}$ = 6.0 V | - | 13 | 26 | ns |
| $t_{PHL}$ | HIGH-to-LOW propagation delay $\overline{MR}$ to Qn | see Figure 8 | | | | |
| | | $V_{CC}$ = 2.0 V | - | 44 | 150 | ns |
| | | $V_{CC}$ = 4.5 V | - | 16 | 30 | ns |
| | | $V_{CC}$ = 5 V; $C_L$ = 15 pF | - | 15 | - | ns |
| | | $V_{CC}$ = 6.0 V | - | 14 | 26 | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | - | 19 | 75 | ns |
| | | $V_{CC}$ = 4.5 V | - | 7 | 15 | ns |
| | | $V_{CC}$ = 6.0 V | - | 6 | 13 | ns |
| $t_W$ | pulse width | | | | | |
| | clock HIGH or LOW | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | 80 | 14 | - | ns |
| | | $V_{CC}$ = 4.5 V | 16 | 5 | - | ns |
| | | $V_{CC}$ = 6.0 V | 14 | 4 | - | ns |
| | master reset LOW | see Figure 8 | | | | |
| | | $V_{CC}$ = 2.0 V | 60 | 17 | - | ns |
| | | $V_{CC}$ = 4.5 V | 12 | 6 | - | ns |
| | | $V_{CC}$ = 6.0 V | 10 | 5 | - | ns |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 9: Dynamic characteristics 74HC273** *...continued*

*Voltages are referenced to GND (ground = 0 V); $t_r = t_f$ = 6 ns; $C_L$ = 50 pF unless otherwise specified; for test circuit see Figure 10.*

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $t_{rec}$ | recovery time $\overline{MR}$ to CP | see Figure 8 | | | | | |
| | | $V_{CC}$ = 2.0 V | | +50 | –6 | - | ns |
| | | $V_{CC}$ = 4.5 V | | +10 | –2 | - | ns |
| | | $V_{CC}$ = 6.0 V | | +9 | –2 | - | ns |
| $t_{su}$ | set-up time Dn to CP | see Figure 9 | | | | | |
| | | $V_{CC}$ = 2.0 V | | 60 | 11 | - | ns |
| | | $V_{CC}$ = 4.5 V | | 12 | 4 | - | ns |
| | | $V_{CC}$ = 6.0 V | | 10 | 3 | - | ns |
| $t_h$ | hold time Dn to CP | see Figure 9 | | | | | |
| | | $V_{CC}$ = 2.0 V | | +3 | –6 | - | ns |
| | | $V_{CC}$ = 4.5 V | | +3 | –2 | - | ns |
| | | $V_{CC}$ = 6.0 V | | +3 | –2 | - | ns |
| $f_{max}$ | maximum input clock frequency | see Figure 7 | | | | | |
| | | $V_{CC}$ = 2.0 V | | 6.0 | 20.6 | - | MHz |
| | | $V_{CC}$ = 4.5 V | | 30 | 103 | - | MHz |
| | | $V_{CC}$ = 5 V; $C_L$ = 15 pF | | - | 66 | - | MHz |
| | | $V_{CC}$ = 6.0 V | | 35 | 122 | - | MHz |
| $C_{PD}$ | power dissipation capacitance | per flip-flop; $V_I$ = GND to $V_{CC}$ | [1] | - | 20 | - | pF |
| **$T_{amb}$ = –40 °C to +85 °C** | | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay CP to Qn | see Figure 7 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | - | 185 | ns |
| | | $V_{CC}$ = 4.5 V | | - | - | 37 | ns |
| | | $V_{CC}$ = 6.0 V | | - | - | 31 | ns |
| $t_{PHL}$ | HIGH-to-LOW propagation delay $\overline{MR}$ to Qn | see Figure 8 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | - | 185 | ns |
| | | $V_{CC}$ = 4.5 V | | - | - | 37 | ns |
| | | $V_{CC}$ = 6.0 V | | - | - | 31 | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | see Figure 7 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | - | 95 | ns |
| | | $V_{CC}$ = 4.5 V | | - | - | 19 | ns |
| | | $V_{CC}$ = 6.0 V | | - | - | 15 | ns |
| $t_W$ | pulse width | | | | | | |
| | clock HIGH or LOW | see Figure 7 | | | | | |
| | | $V_{CC}$ = 2.0 V | | 100 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | | 20 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | | 17 | - | - | ns |
| | master reset LOW | see Figure 8 | | | | | |
| | | $V_{CC}$ = 2.0 V | | 75 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | | 15 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | | 13 | - | - | ns |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 9: Dynamic characteristics 74HC273** *...continued*

*Voltages are referenced to GND (ground = 0 V); $t_r = t_f$ = 6 ns; $C_L$ = 50 pF unless otherwise specified; for test circuit see Figure 10.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $t_{rec}$ | recovery time $\overline{MR}$ to CP | see Figure 8 | | | | |
| | | $V_{CC}$ = 2.0 V | 65 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | 13 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | 11 | - | - | ns |
| $t_{su}$ | set-up time Dn to CP | see Figure 9 | | | | |
| | | $V_{CC}$ = 2.0 V | 75 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | 15 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | 13 | - | - | ns |
| $t_h$ | hold time Dn to CP | see Figure 9 | | | | |
| | | $V_{CC}$ = 2.0 V | 3 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | 3 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | 3 | - | - | ns |
| $f_{max}$ | maximum input clock frequency | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | 4.8 | - | - | MHz |
| | | $V_{CC}$ = 4.5 V | 24 | - | - | MHz |
| | | $V_{CC}$ = 6.0 V | 28 | - | - | MHz |
| **$T_{amb}$ = −40 °C to +125 °C** | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay CP to Qn | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | - | - | 225 | ns |
| | | $V_{CC}$ = 4.5 V | - | - | 45 | ns |
| | | $V_{CC}$ = 6.0 V | - | - | 38 | ns |
| $t_{PHL}$ | HIGH-to-LOW propagation delay $\overline{MR}$ to Qn | see Figure 8 | | | | |
| | | $V_{CC}$ = 2.0 V | - | - | 225 | ns |
| | | $V_{CC}$ = 4.5 V | - | - | 45 | ns |
| | | $V_{CC}$ = 6.0 V | - | - | 38 | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | - | - | 110 | ns |
| | | $V_{CC}$ = 4.5 V | - | - | 22 | ns |
| | | $V_{CC}$ = 6.0 V | - | - | 19 | ns |
| $t_W$ | pulse width | | | | | |
| | clock HIGH or LOW | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | 120 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | 24 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | 20 | - | - | ns |
| | master reset LOW | see Figure 8 | | | | |
| | | $V_{CC}$ = 2.0 V | 90 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | 18 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | 15 | - | - | ns |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 9: Dynamic characteristics 74HC273** *...continued*

*Voltages are referenced to GND (ground = 0 V); $t_r = t_f$ = 6 ns; $C_L$ = 50 pF unless otherwise specified; for test circuit see Figure 10.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $t_{rec}$ | recovery time $\overline{MR}$ to CP | see Figure 8 | | | | |
| | | $V_{CC}$ = 2.0 V | 75 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | 15 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | 13 | - | - | ns |
| $t_{su}$ | set-up time Dn to CP | see Figure 9 | | | | |
| | | $V_{CC}$ = 2.0 V | 90 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | 18 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | 15 | - | - | ns |
| $t_h$ | hold time Dn to CP | see Figure 9 | | | | |
| | | $V_{CC}$ = 2.0 V | 3 | - | - | ns |
| | | $V_{CC}$ = 4.5 V | 3 | - | - | ns |
| | | $V_{CC}$ = 6.0 V | 3 | - | - | ns |
| $f_{max}$ | maximum input clock frequency | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | 4.0 | - | - | MHz |
| | | $V_{CC}$ = 4.5 V | 20 | - | - | MHz |
| | | $V_{CC}$ = 6.0 V | 24 | - | - | MHz |

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

**Table 10: Dynamic characteristics 74HCT273**

*Voltages are referenced to GND (ground = 0 V); $t_r = t_f$ = 6 ns; $C_L$ = 50 pF unless otherwise specified; for test circuit see Figure 10.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **$T_{amb}$ = 25 °C** | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay CP to Qn | see Figure 7 | | | | |
| | | $V_{CC}$ = 4.5 V | - | 16 | 30 | ns |
| | | $V_{CC}$ = 5 V; $C_L$ = 15 pF | - | 15 | - | ns |
| $t_{PHL}$ | HIGH-to-LOW propagation delay $\overline{MR}$ to Qn | see Figure 8 | | | | |
| | | $V_{CC}$ = 4.5 V | - | 23 | 34 | ns |
| | | $V_{CC}$ = 5 V; $C_L$ = 15 pF | - | 20 | - | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | $V_{CC}$ = 4.5 V; see Figure 7 | - | 7 | 15 | ns |
| $t_W$ | pulse width | | | | | |
| | clock HIGH or LOW | $V_{CC}$ = 4.5 V; see Figure 7 | 16 | 9 | - | ns |
| | master reset LOW | $V_{CC}$ = 4.5 V; see Figure 8 | 16 | 8 | - | ns |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**Table 10: Dynamic characteristics 74HCT273** *…continued*

*Voltages are referenced to GND (ground = 0 V); $t_r = t_f$ = 6 ns; $C_L$ = 50 pF unless otherwise specified; for test circuit see Figure 10.*

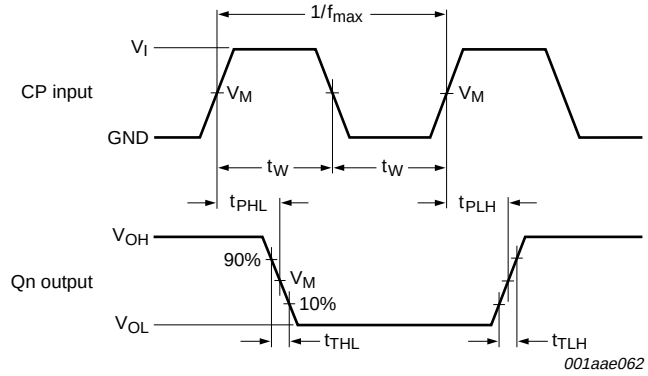
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $t_{rec}$ | recovery time $\overline{MR}$ to CP | $V_{CC}$ = 4.5 V; see Figure 8 | | +10 | –2 | - | ns |
| $t_{su}$ | set-up time Dn to CP | $V_{CC}$ = 4.5 V; see Figure 9 | | 12 | 5 | - | ns |
| $t_h$ | hold time Dn to CP | $V_{CC}$ = 4.5 V; see Figure 9 | | +3 | –4 | - | ns |
| $f_{max}$ | maximum input clock frequency | see Figure 7 | | | | | |
| | | $V_{CC}$ = 4.5 V | | 30 | 56 | - | MHz |
| | | $V_{CC}$ = 5.0 V; $C_L$ = 15 pF | | - | 36 | - | MHz |
| $C_{PD}$ | power dissipation capacitance | per flip-flop; $V_I$ = GND to ($V_{CC}$ – 1.5 V) | [1] | - | 23 | - | pF |
| **$T_{amb}$ = –40 °C to +85 °C** | | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay CP to Qn | $V_{CC}$ = 4.5 V; see Figure 7 | | - | - | 38 | ns |
| $t_{PHL}$ | HIGH-to-LOW propagation delay $\overline{MR}$ to Qn | $V_{CC}$ = 4.5 V; see Figure 8 | | - | - | 43 | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | $V_{CC}$ = 4.5 V; see Figure 7 | | - | - | 19 | ns |
| $t_W$ | pulse width | | | | | | |
| | clock HIGH or LOW | $V_{CC}$ = 4.5 V; see Figure 7 | | 20 | - | - | ns |
| | master reset LOW | $V_{CC}$ = 4.5 V; see Figure 8 | | 20 | - | - | ns |
| $t_{rec}$ | recovery time $\overline{MR}$ to CP | $V_{CC}$ = 4.5 V; see Figure 8 | | 13 | - | - | ns |
| $t_{su}$ | set-up time Dn to CP | $V_{CC}$ = 4.5 V; see Figure 9 | | 15 | - | - | ns |
| $t_h$ | hold time Dn to CP | $V_{CC}$ = 4.5 V; see Figure 9 | | 3 | - | - | ns |
| $f_{max}$ | maximum input clock frequency | $V_{CC}$ = 4.5 V; see Figure 7 | | 24 | - | - | MHz |
| **$T_{amb}$ = –40 °C to +125 °C** | | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay CP to Qn | $V_{CC}$ = 4.5 V; see Figure 7 | | - | - | 45 | ns |
| $t_{PHL}$ | HIGH-to-LOW propagation delay $\overline{MR}$ to Qn | $V_{CC}$ = 4.5 V; see Figure 8 | | - | - | 51 | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | $V_{CC}$ = 4.5 V; see Figure 7 | | - | - | 22 | ns |
| $t_W$ | pulse width | | | | | | |
| | clock HIGH or LOW | $V_{CC}$ = 4.5 V; see Figure 7 | | 24 | - | - | ns |
| | master reset LOW | $V_{CC}$ = 4.5 V; see Figure 8 | | 24 | - | - | ns |
| $t_{rec}$ | recovery time $\overline{MR}$ to CP | $V_{CC}$ = 4.5 V; see Figure 8 | | 15 | - | - | ns |
| $t_{su}$ | set-up time Dn to CP | $V_{CC}$ = 4.5 V; see Figure 9 | | 18 | - | - | ns |
| $t_h$ | hold time Dn to CP | $V_{CC}$ = 4.5 V; see Figure 9 | | 3 | - | - | ns |
| $f_{max}$ | maximum input clock frequency | $V_{CC}$ = 4.5 V; see Figure 7 | | 20 | - | - | MHz |

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


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

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

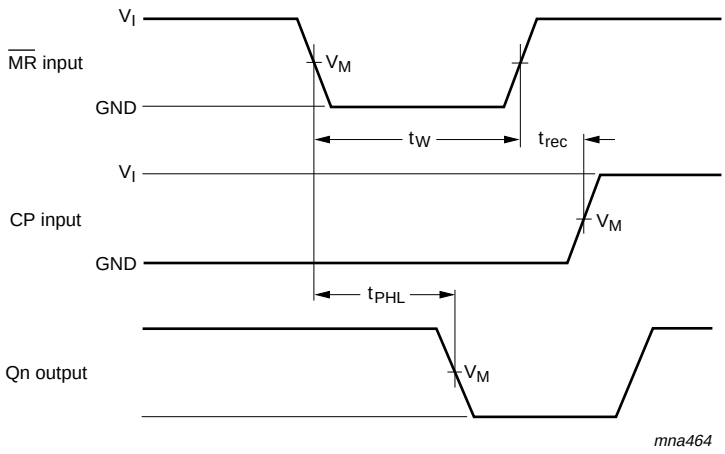
## 12. Waveforms




Measurement points are given in Table 11.

$V_{OL}$ and $V_{OH}$ are typical voltage output drop that occur with the output load.

**Fig 7. Propagation delay clock input (CP) to output (Qn), clock (CP) pulse width, output transition time and the maximum clock pulse frequency**

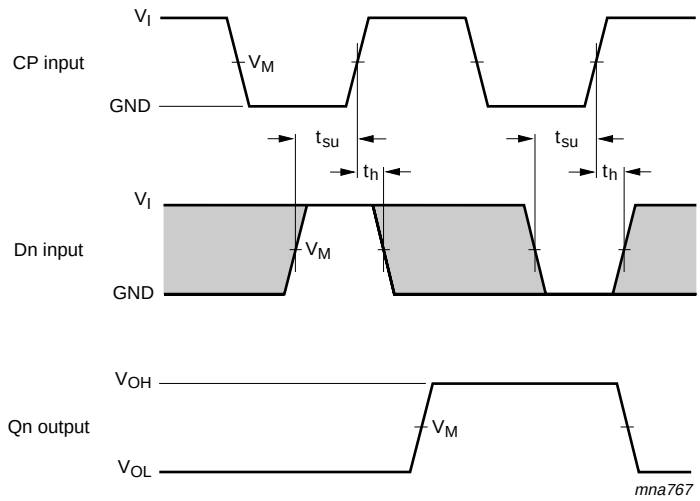



Measurement points are given in Table 11.

$V_{OL}$ and $V_{OH}$ are typical voltage output drop that occur with the output load.

**Fig 8. Propagation delay master reset ($\overline{MR}$) to output (Qn), pulse width master reset ($\overline{MR}$) and recovery time master reset ($\overline{MR}$) to clock (CP)**


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.




Measurement points are given in Table 11.

The shaded areas indicate when the input is permitted to change for predictable output performance.

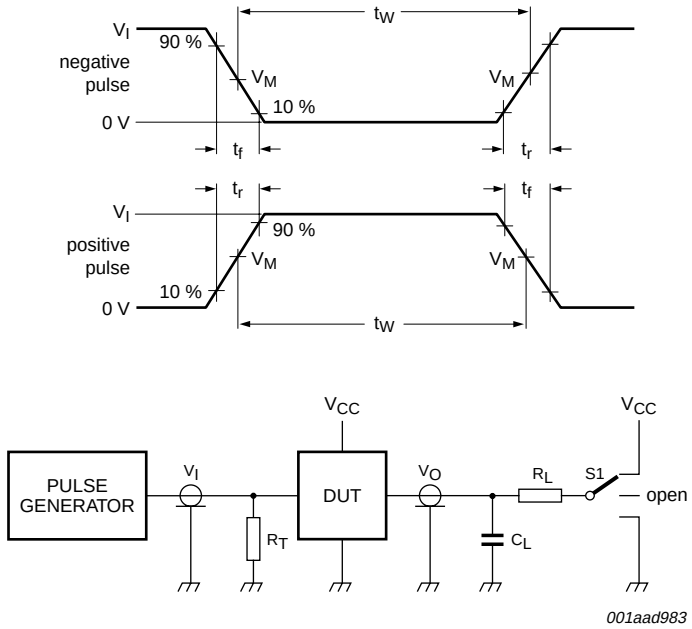
$V_{OL}$ and $V_{OH}$ are typical voltage output drop that occur with the output load.

**Fig 9. Data set-up and hold times data input (Dn)**

**Table 11: Measurement points**

| Type | Input | Output |
|---|---|---|
| | $V_M$ | $V_M$ |
| 74HC273 | $0.5V_{CC}$ | $0.5V_{CC}$ |
| 74HCT273 | 1.3 V | 1.3 V |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.




Test data is given in Table 12.

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 10. Load circuitry for measuring switching times**

**Table 12: Test data**

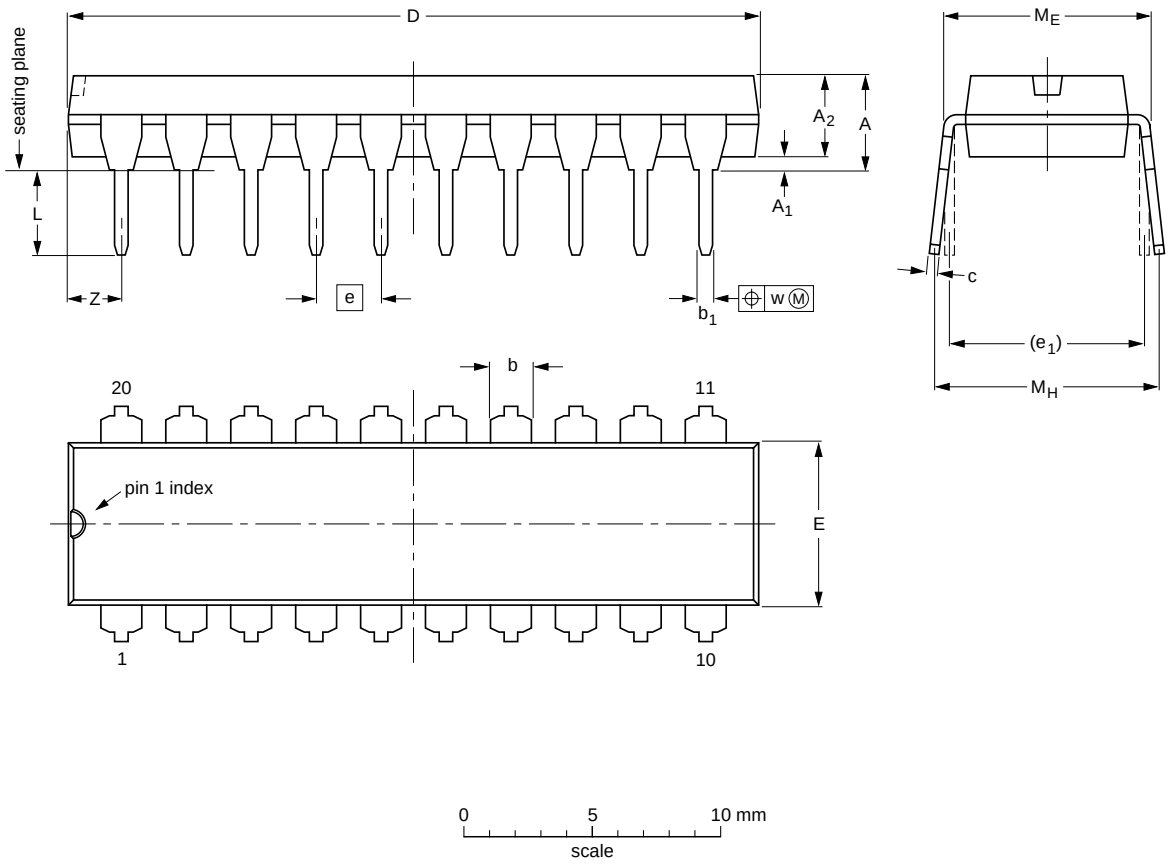
| Type | Input | | Load | | S1 position | | |
|---|---|---|---|---|---|---|---|
| | $V_I$ | $t_r$, $t_f$ | $C_L$ | $R_L$ | $t_{PHL}$, $t_{PLH}$ | $t_{PZH}$, $t_{PHZ}$ | $t_{PZL}$, $t_{PLZ}$ |
| 74HC273 | $V_{CC}$ | 6 ns | 15 pF, 50 pF | 1 kΩ | open | GND | $V_{CC}$ |
| 74HCT273 | 3 V | 6 ns | 15 pF, 50 pF | 1 kΩ | open | GND | $V_{CC}$ |



© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

## 13. Package outline

**DIP20: plastic dual in-line package; 20 leads (300 mil)** **SOT146-1**




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

| UNIT | A max. | $A_1$ min. | $A_2$ max. | b | $b_1$ | c | D (1) | E (1) | e | $e_1$ | L | $M_E$ | $M_H$ | w | Z (1) max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 4.2 | 0.51 | 3.2 | 1.73<br>1.30 | 0.53<br>0.38 | 0.36<br>0.23 | 26.92<br>26.54 | 6.40<br>6.22 | 2.54 | 7.62 | 3.60<br>3.05 | 8.25<br>7.80 | 10.0<br>8.3 | 0.254 | 2 |
| inches | 0.17 | 0.02 | 0.13 | 0.068<br>0.051 | 0.021<br>0.015 | 0.014<br>0.009 | 1.060<br>1.045 | 0.25<br>0.24 | 0.1 | 0.3 | 0.14<br>0.12 | 0.32<br>0.31 | 0.39<br>0.33 | 0.01 | 0.078 |

**Note**

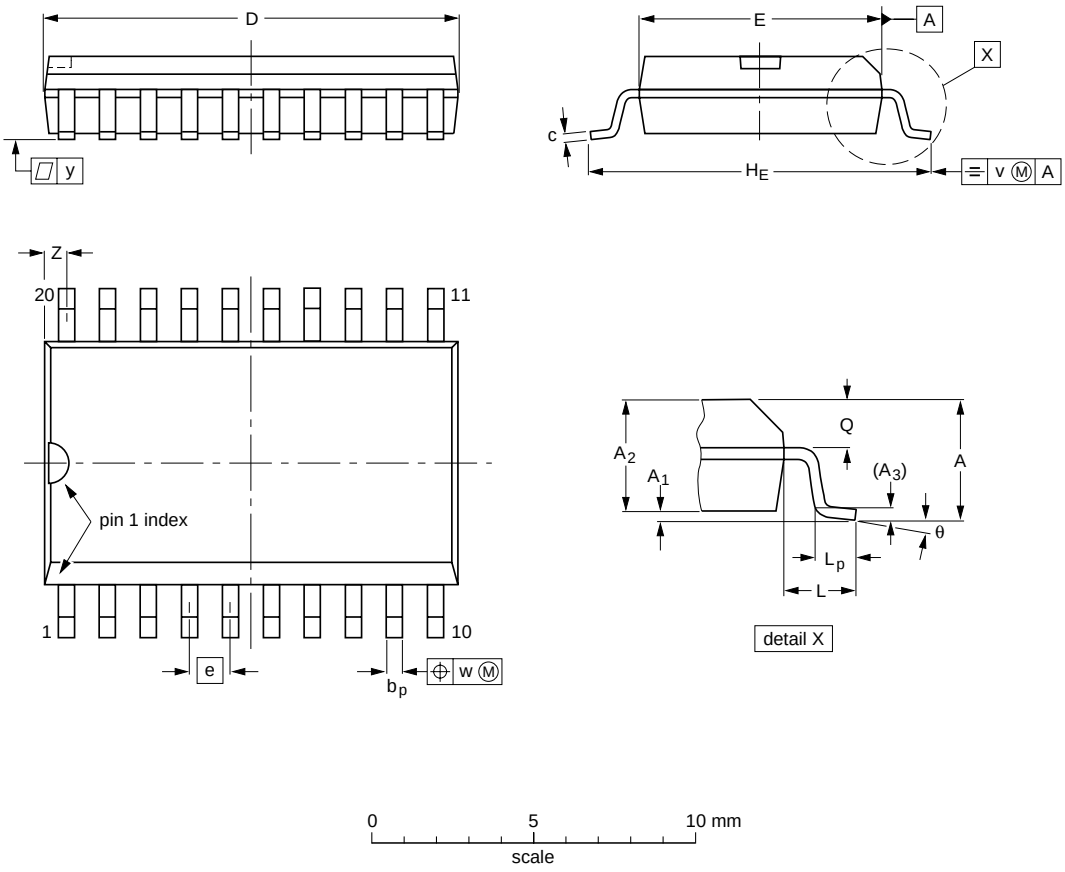
1. Plastic or metal protrusions of 0.25 mm (0.01 inch) maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT146-1 | | MS-001 | SC-603 | | | ~~99-12-27~~<br>03-02-13 |

**Fig 11. Package outline SOT146-1 (DIP20)**


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**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**

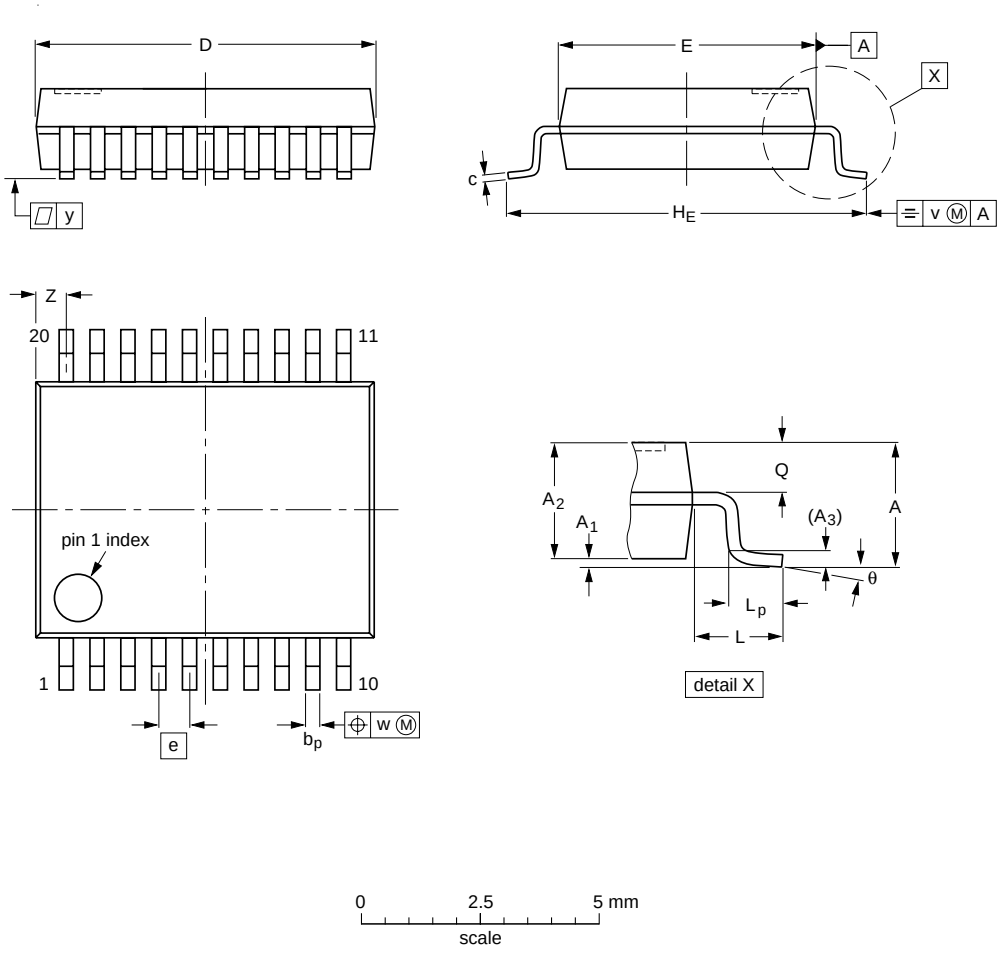
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

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

**Fig 12. Package outline SOT163-1 (SO20)**


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm** **SOT339-1**




**DIMENSIONS (mm are the original 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 | 0.21<br>0.05 | 1.80<br>1.65 | 0.25 | 0.38<br>0.25 | 0.20<br>0.09 | 7.4<br>7.0 | 5.4<br>5.2 | 0.65 | 7.9<br>7.6 | 1.25 | 1.03<br>0.63 | 0.9<br>0.7 | 0.2 | 0.13 | 0.1 | 0.9<br>0.5 | $8^o$<br>$0^o$ |

**Note**

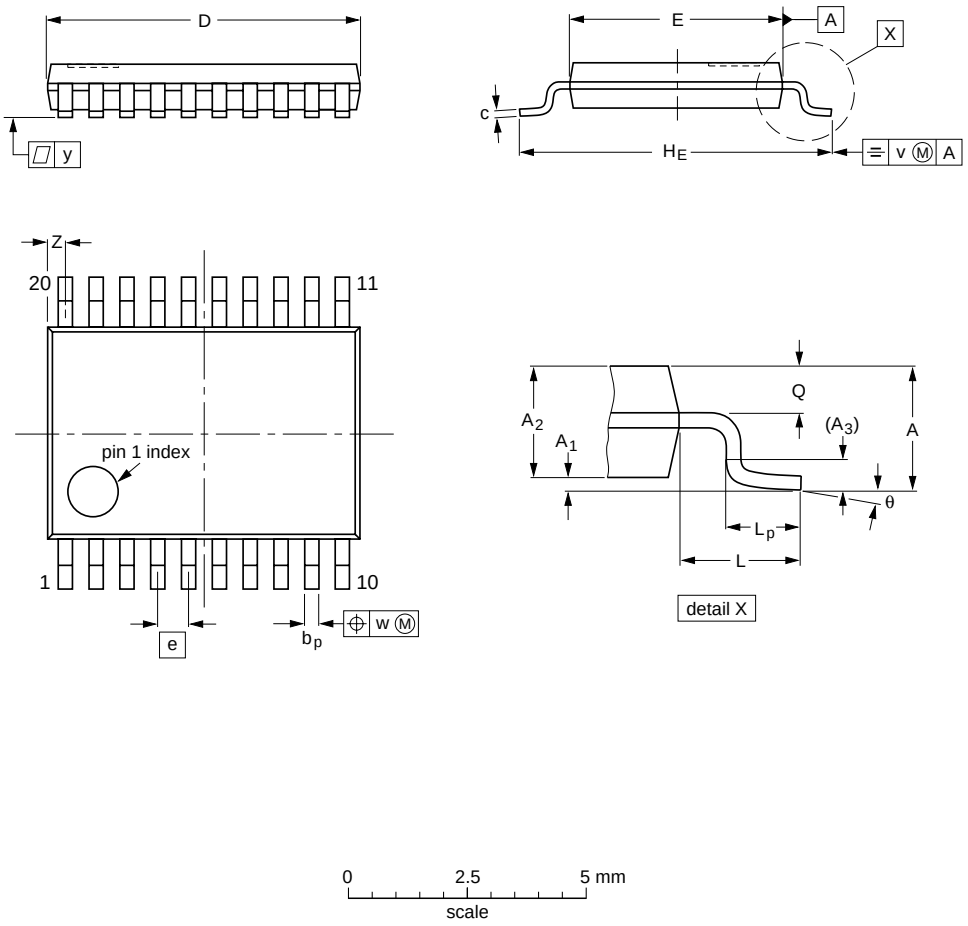
1. Plastic or metal protrusions of 0.2 mm maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT339-1 | | MO-150 | | | | ~~99-12-27~~<br>03-02-19 |

**Fig 13. Package outline SOT339-1 (SSOP20)**


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**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**

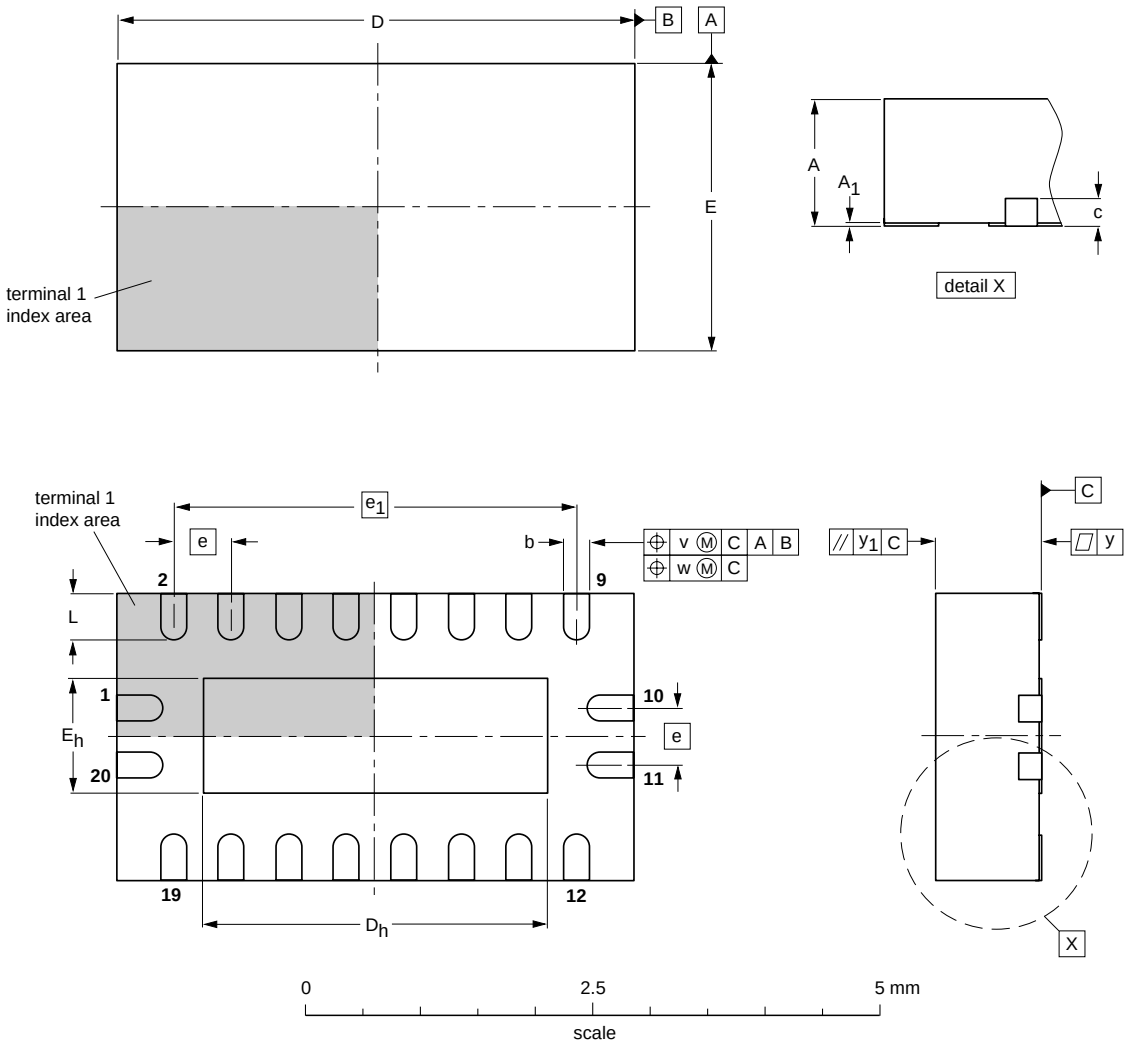
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

| 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)**


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

**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)**


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

## 14. Abbreviations

**Table 13: Abbreviations**

| Acronym | Description |
|---|---|
| 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 |
| MOS | Metal Oxide Semiconductor |

## 15. Revision history

**Table 14: Revision history**

| Document ID | Release date | Data sheet status | Change notice | Doc. number | Supersedes |
|---|---|---|---|---|---|
| 74HC_HCT273_3 | 20060124 | Product data sheet | - | - | 74HC_HCT273_CNV_2 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.<br>• Section 4 “Ordering information”, Section 6 “Pinning information” and Section 13 “Package outline”: Added DHVQFN package information<br>• Section 10 “Static characteristics”: Added from the family specification | | | | |
| 74HC_HCT273_CNV_2 | 19970827 | Product specification | - | - | - |


© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

## 16. Data sheet status

| Level | Data sheet status [1] | Product status [2] [3] | Definition |
|---|---|---|---|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
| II | Preliminary data | Qualification | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product. |
| III | Product data | Production | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). |

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

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

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

## 17. Definitions

**Short-form specification —** The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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

**Application information —** Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

## 18. Disclaimers

**Life support —** These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

**Right to make changes —** Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

## 19. Trademarks

**Notice —** All referenced brands, product names, service names and trademarks are the property of their respective owners.

## 20. Contact information

For additional information, please visit: **http://www.semiconductors.philips.com**

For sales office addresses, send an email to: **sales.addresses@www.semiconductors.philips.com**



© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

## 21. Contents


| | | |
|---|---|---|
| **1** | **General description** | **1** |
| **2** | **Features** | **1** |
| **3** | **Quick reference data** | **1** |
| **4** | **Ordering information** | **2** |
| **5** | **Functional diagram** | **3** |
| **6** | **Pinning information** | **5** |
| 6.1 | Pinning | 5 |
| 6.2 | Pin description | 5 |
| **7** | **Functional description** | **6** |
| 7.1 | Function table | 6 |
| **8** | **Limiting values** | **6** |
| **9** | **Recommended operating conditions** | **7** |
| **10** | **Static characteristics** | **7** |
| **11** | **Dynamic characteristics** | **11** |
| **12** | **Waveforms** | **16** |
| **13** | **Package outline** | **19** |
| **14** | **Abbreviations** | **24** |
| **15** | **Revision history** | **24** |
| **16** | **Data sheet status** | **25** |
| **17** | **Definitions** | **25** |
| **18** | **Disclaimers** | **25** |
| **19** | **Trademarks** | **25** |
| **20** | **Contact information** | **25** |


**© Koninklijke Philips Electronics N.V. 2006**

All rights reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

**Date of release: 24 January 2006**
**Document number: 74HC_HCT273_3**

**Published in The Netherlands**

LifeElectronics
Живое партнерство

**ООО «ЛайфЭлектроникс»** **“LifeElectronics” LLC**

*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

*Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.*

*С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров*

*Мы предлагаем:*

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

*В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.*

*Конструкторский отдел помогает осуществить:*

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

*Тел: +7 (812) 336 43 04 (многоканальный)*
*Email: org@lifeelectronics.ru*

***www.lifeelectronics.ru***