# DATA SHEET

# 74HC00; 74HCT00
## Quad 2-input NAND gate

Product specification
Supersedes data of 1997 Aug 26

2003 Jun 30

Philips
Semiconductors

## FEATURES

- Complies with JEDEC standard no. 8-1A
- ESD protection:
  HBM EIA/JESD22-A114-A exceeds 2000 V
  MM EIA/JESD22-A115-A exceeds 200 V
- Specified from –40 to +85 °C and –40 to +125 °C.

## DESCRIPTION

The 74HC00/74HCT00 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSTTL). They are specified in compliance with JEDEC standard no. 7A.

The 74HC00/74HCT00 provide the 2-input NAND function.

## QUICK REFERENCE DATA

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

| SYMBOL | PARAMETER | CONDITIONS | TYPICAL | | UNIT |
|---|---|---|---|---|---|
| | | | 74HC00 | 74HCT00 | |
| $t_{PHL}/t_{PLH}$ | propagation delay nA, nB to nY | $C_L$ = 15 pF; $V_{CC}$ = 5 V | 7 | 10 | ns |
| $C_I$ | input capacitance | | 3.5 | 3.5 | pF |
| $C_{PD}$ | power dissipation capacitance per gate | notes 1 and 2 | 22 | 22 | pF |

**Notes**

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 Volts;
   N = total load switching outputs;
   $\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.
2. For 74HC00 the condition is $V_I$ = GND to $V_{CC}$.
   For 74HCT00 the condition is $V_I$ = GND to $V_{CC}$ – 1.5 V.

## FUNCTION TABLE

See note 1.

| INPUT | | OUTPUT |
|---|---|---|
| nA | nB | nY |
| L | L | H |
| L | H | H |
| H | L | H |
| H | H | L |

**Note**

1. H = HIGH voltage level;
   L = LOW voltage level.

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | | | |
|---|---|---|---|---|---|
| | TEMPERATURE RANGE | PINS | PACKAGE | MATERIAL | CODE |
| 74HC00N | –40 to +125 °C | 14 | DIP14 | plastic | SOT27-1 |
| 74HCT00N | –40 to +125 °C | 14 | DIP14 | plastic | SOT27-1 |
| 74HC00D | –40 to +125 °C | 14 | SO14 | plastic | SOT108-1 |
| 74HCT00D | –40 to +125 °C | 14 | SO14 | plastic | SOT108-1 |
| 74HC00DB | –40 to +125 °C | 14 | SSOP14 | plastic | SOT337-1 |
| 74HCT00DB | –40 to +125 °C | 14 | SSOP14 | plastic | SOT337-1 |
| 74HC00PW | –40 to +125 °C | 14 | TSSOP14 | plastic | SOT402-1 |
| 74HCT00PW | –40 to +125 °C | 14 | TSSOP14 | plastic | SOT402-1 |
| 74HC00BQ | –40 to +125 °C | 14 | DHVQFN14 | plastic | SOT762-1 |
| 74HCT00BQ | –40 to +125 °C | 14 | DHVQFN14 | plastic | SOT762-1 |

## PINNING

| PIN | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | 1A | data input |
| 2 | 1B | data input |
| 3 | 1Y | data output |
| 4 | 2A | data input |
| 5 | 2B | data input |
| 6 | 2Y | data output |
| 7 | GND | ground (0 V) |
| 8 | 3Y | data output |
| 9 | 3A | data input |
| 10 | 3B | data input |
| 11 | 4Y | data output |
| 12 | 4A | data input |
| 13 | 4B | data input |
| 14 | $V_{CC}$ | supply voltage |

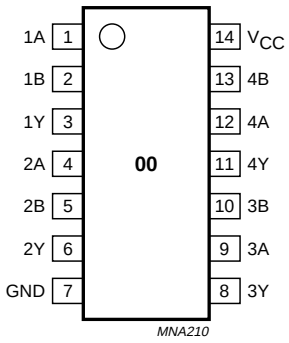
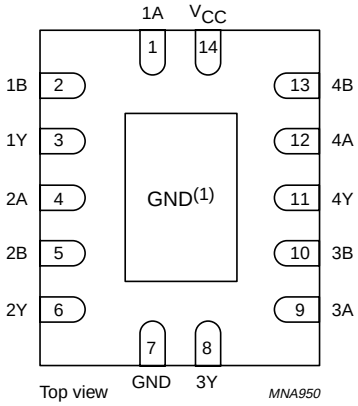



Fig.1 Pin configuration DIP14, SO14 and (T)SSOP14.




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

Fig.2 Pin configuration DHVQFN14.

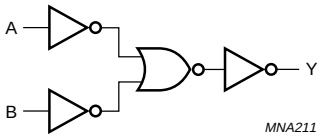



Fig.3 Logic diagram (one gate).

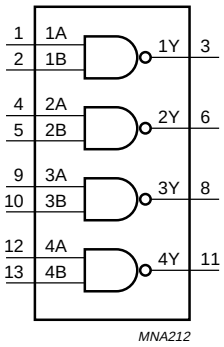



Fig.4 Function diagram.

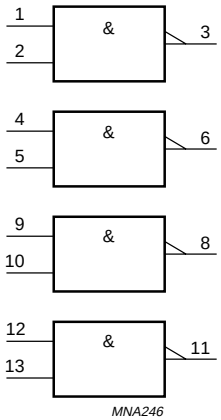



Fig.5 IEC logic symbol.

## RECOMMENDED OPERATING CONDITIONS

| SYMBOL | PARAMETER | CONDITIONS | 74HC00 | | | 74HCT00 | | | 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 |
| $T_{amb}$ | operating ambient temperature | see DC and AC characteristics per device | –40 | +25 | +125 | –40 | +25 | +125 | °C |
| $t_r$, $t_f$ | input rise and fall times | $V_{CC}$ = 2.0 V | – | – | 1000 | – | – | – | ns |
| | | $V_{CC}$ = 4.5 V | – | 6.0 | 500 | – | 6.0 | 500 | ns |
| | | $V_{CC}$ = 6.0 V | – | – | 400 | – | – | – | ns |

## 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 |
| $I_{IK}$ | input diode current | $V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V | – | ±20 | mA |
| $I_{OK}$ | output diode current | $V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V | – | ±20 | mA |
| $I_O$ | output source or sink current | $-0.5\text{ V} < V_O < V_{CC} + 0.5$ V | – | ±25 | mA |
| $I_{CC}$, $I_{GND}$ | $V_{CC}$ or GND current | | – | ±50 | mA |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $P_{tot}$ | power dissipation | $T_{amb}$ = –40 to +125 °C; note 1 | – | 500 | mW |

**Note**

1. For DIP14 packages: above 70 °C derate linearly with 12 mW/K.
   For SO14 packages: above 70 °C derate linearly with 8 mW/K.
   For SSOP14 and TSSOP14 packages: above 60 °C derate linearly with 5.5 mW/K.
   For DHVQFN14 packages: above 60 °C derate linearly with 4.5 mW/K.

## DC CHARACTERISTICS

### Type 74HC00

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

| SYMBOL | PARAMETER | TEST CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| | | OTHER | $V_{CC}$ (V) | | | | |
| **$T_{amb}$ = –40 to +85 °C**; note 1 | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | | 2.0 | 1.5 | 1.2 | – | V |
| | | | 4.5 | 3.15 | 2.4 | – | V |
| | | | 6.0 | 4.2 | 3.2 | – | V |
| $V_{IL}$ | LOW-level input voltage | | 2.0 | – | 0.8 | 0.5 | V |
| | | | 4.5 | – | 2.1 | 1.35 | V |
| | | | 6.0 | – | 2.8 | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = –20 μA | 2.0 | 1.9 | 2.0 | – | V |
| | | $I_O$ = –20 μA | 4.5 | 4.4 | 4.5 | – | V |
| | | $I_O$ = –20 μA | 6.0 | 5.9 | 6.0 | – | V |
| | | $I_O$ = –4.0 mA | 4.5 | 3.84 | 4.32 | – | V |
| | | $I_O$ = –5.2 mA | 6.0 | 5.34 | 5.81 | – | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = 20 μA | 2.0 | – | 0 | 0.1 | V |
| | | $I_O$ = 20 μA | 4.5 | – | 0 | 0.1 | V |
| | | $I_O$ = 20 μA | 6.0 | – | 0 | 0.1 | V |
| | | $I_O$ = 4.0 mA | 4.5 | – | 0.15 | 0.33 | V |
| | | $I_O$ = 5.2 mA | 6.0 | – | 0.16 | 0.33 | V |
| $I_{LI}$ | input leakage current | $V_I$ = $V_{CC}$ or GND | 6.0 | – | – | ±1.0 | μA |
| $I_{OZ}$ | 3-state output OFF current | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_O$ = $V_{CC}$ or GND | 6.0 | – | – | ±.5.0 | μA |
| $I_{CC}$ | quiescent supply current | $V_I$ = $V_{CC}$ or GND; $I_O$ = 0 | 6.0 | – | – | 20 | μA |

| SYMBOL | PARAMETER | TEST CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| | | OTHER | $V_{CC}$ (V) | | | | |
| **$T_{amb}$ = −40 to +125 °C** | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | | 2.0 | 1.5 | – | – | V |
| | | | 4.5 | 3.15 | – | – | V |
| | | | 6.0 | 4.2 | – | – | V |
| $V_{IL}$ | LOW-level input voltage | | 2.0 | – | – | 0.5 | V |
| | | | 4.5 | – | – | 1.35 | V |
| | | | 6.0 | – | – | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = –20 μA | 2.0 | 1.9 | – | – | V |
| | | $I_O$ = –20 μA | 4.5 | 4.4 | – | – | V |
| | | $I_O$ = –20 μA | 6.0 | 5.9 | – | – | V |
| | | $I_O$ = –4.0 mA | 4.5 | 3.7 | – | – | V |
| | | $I_O$ = –5.2 mA | 6.0 | 5.2 | – | – | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = 20 μA | 2.0 | – | – | 0.1 | V |
| | | $I_O$ = 20 μA | 4.5 | – | – | 0.1 | V |
| | | $I_O$ = 20 μA | 6.0 | – | – | 0.1 | V |
| | | $I_O$ = 4.0 mA | 4.5 | – | – | 0.4 | V |
| | | $I_O$ = 5.2 mA | 6.0 | – | – | 0.4 | V |
| $I_{LI}$ | input leakage current | $V_I$ = $V_{CC}$ or GND | 6.0 | – | – | ±1.0 | μA |
| $I_{OZ}$ | 3-state output OFF current | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_O$ = $V_{CC}$ or GND | 6.0 | – | – | ±10.0 | μA |
| $I_{CC}$ | quiescent supply current | $V_I$ = $V_{CC}$ or GND; $I_O$ = 0 | 6.0 | – | – | 40 | μA |

**Note**

1. All typical values are measured at $T_{amb}$ = 25 °C.

**Type 74HCT00**

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

| SYMBOL | PARAMETER | TEST CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| | | OTHER | $V_{CC}$ (V) | | | | |
| **$T_{amb}$ = −40 to +85 °C**; note 1 | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | | 4.5 to 5.5 | 2.0 | 1.6 | – | V |
| $V_{IL}$ | LOW-level input voltage | | 4.5 to 5.5 | – | 1.2 | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = −20 μA | 4.5 | 4.4 | 4.5 | – | V |
| | | $I_O$ = −4.0 mA | 4.5 | 3.84 | 4.32 | – | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = 20 μA | 4.5 | – | 0 | 0.1 | V |
| | | $I_O$ = 4.0 mA | 4.5 | – | 0.15 | 0.33 | V |
| $I_{LI}$ | input leakage current | $V_I$ = $V_{CC}$ or GND | 5.5 | – | – | ±1.0 | μA |
| $I_{OZ}$ | 3-state output OFF current | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_O$ = $V_{CC}$ or GND; $I_O$ = 0 | 5.5 | – | – | ±5.0 | μA |
| $I_{CC}$ | quiescent supply current | $V_I$ = $V_{CC}$ or GND; $I_O$ = 0 | 5.5 | – | – | 20 | μA |
| $\Delta I_{CC}$ | additional supply current per input | $V_I$ = $V_{CC}$ − 2.1 V; $I_O$ = 0 | 4.5 to 5.5 | – | 150 | 675 | μA |
| **$T_{amb}$ = −40 to +125 °C** | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | | 4.5 to 5.5 | 2.0 | – | – | V |
| $V_{IL}$ | LOW-level input voltage | | 4.5 to 5.5 | – | – | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = −20 μA | 4.5 | 4.4 | – | – | V |
| | | $I_O$ = −4.0 mA | 4.5 | 3.7 | – | – | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = 20 μA | 4.5 | – | – | 0.1 | V |
| | | $I_O$ = 4.0 mA | 4.5 | – | – | 0.4 | V |
| $I_{LI}$ | input leakage current | $V_I$ = $V_{CC}$ or GND | 5.5 | – | – | ±1.0 | μA |
| $I_{OZ}$ | 3-state output OFF current | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_O$ = $V_{CC}$ or GND; $I_O$ = 0 | 5.5 | – | – | ±10 | μA |
| $I_{CC}$ | quiescent supply current | $V_I$ = $V_{CC}$ or GND; $I_O$ = 0 | 5.5 | – | – | 40 | μA |
| $\Delta I_{CC}$ | additional supply current per input | $V_I$ = $V_{CC}$ − 2.1 V; $I_O$ = 0 | 4.5 to 5.5 | – | – | 735 | μA |

**Note**

1. All typical values are measured at $T_{amb}$ = 25 °C.

## AC CHARACTERISTICS

### Type 74HC00

GND = 0 V; $t_r = t_f$ = 6 ns; $C_L$ = 50 pF.

| SYMBOL | PARAMETER | TEST CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| | | WAVEFORMS | $V_{CC}$ (V) | | | | |
| **$T_{amb}$ = −40 to +85 °C**; note 1 | | | | | | | |
| $t_{PHL}/t_{PLH}$ | propagation delay nA, nB to nY | see Fig.6 | 2.0 | – | 25 | 115 | ns |
| | | see Fig.6 | 4.5 | – | 9 | 23 | ns |
| | | see Fig.6 | 6.0 | – | 7 | 20 | ns |
| $t_{THL}/t_{TLH}$ | output transition time | | 2.0 | – | 19 | 95 | ns |
| | | | 4.5 | – | 7 | 19 | ns |
| | | | 6.0 | – | 6 | 16 | ns |
| **$T_{amb}$ = −40 to +125 °C** | | | | | | | |
| $t_{PHL}/t_{PLH}$ | propagation delay nA, nB to nY | see Fig.6 | 2.0 | – | – | 135 | ns |
| | | see Fig.6 | 4.5 | – | – | 27 | ns |
| | | see Fig.6 | 6.0 | – | – | 23 | ns |
| $t_{THL}/t_{TLH}$ | output transition time | | 2.0 | – | – | 110 | ns |
| | | | 4.5 | – | – | 22 | ns |
| | | | 6.0 | – | – | 19 | ns |

**Note**

1. All typical values are measured at $T_{amb}$ = 25 °C.

### Type 74HCT00

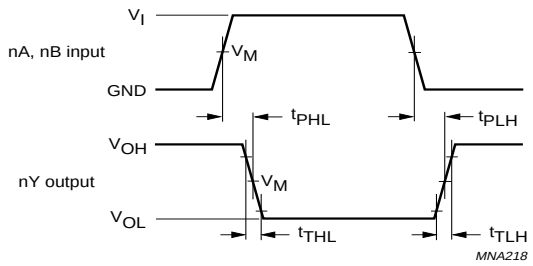
GND = 0 V; $t_r = t_f$ = 6 ns; $C_L$ = 50 pF

| SYMBOL | PARAMETER | TEST CONDITIONS | | MIN. | TYP | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| | | WAVEFORMS | $V_{CC}$ (V) | | | | |
| **$T_{amb}$ = −40 to +85 °C**; note 1 | | | | | | | |
| $t_{PHL}/t_{PLH}$ | propagation delay nA, nB to nY | see Fig.6 | 4.5 | – | 12 | 24 | ns |
| $t_{THL}/t_{TLH}$ | output transition time | | 4.5 | – | – | 29 | ns |
| **$T_{amb}$ = −40 to +125 °C** | | | | | | | |
| $t_{PHL}/t_{PLH}$ | propagation delay nA, nB to nY | see Fig.6 | 4.5 | – | – | 29 | ns |
| $t_{THL}/t_{TLH}$ | output transition time | | 4.5 | – | – | 22 | ns |

**Note**

1. All typical values are measured at $T_{amb}$ = 25 °C.

**AC WAVEFORMS**

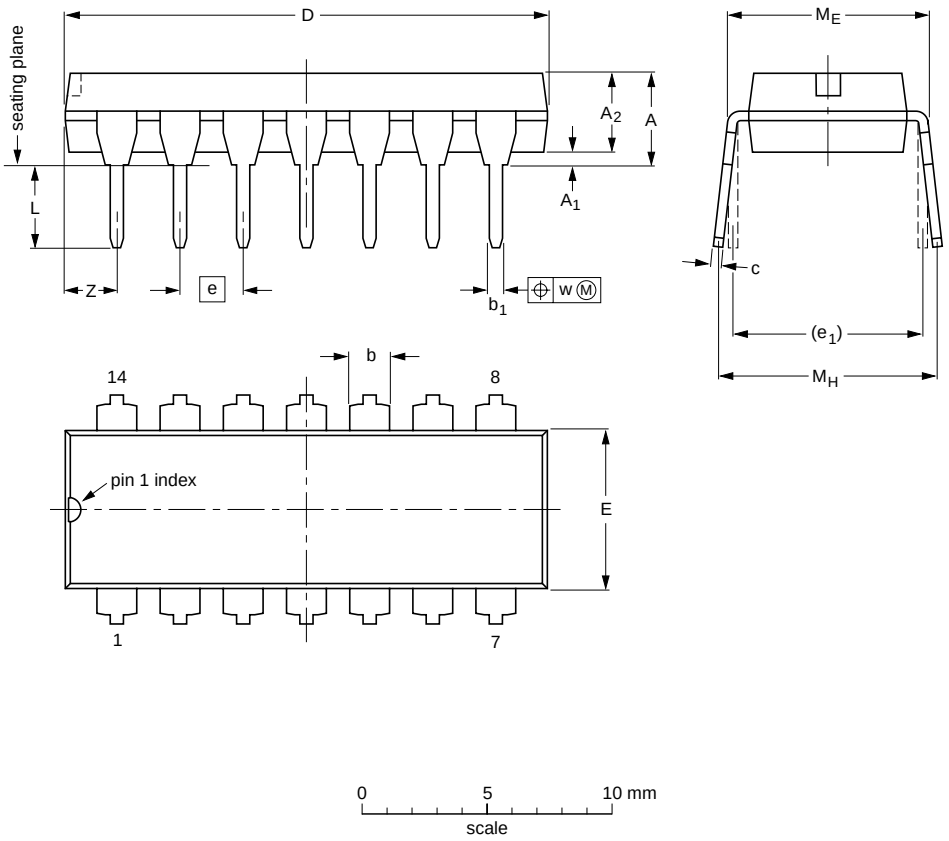



74HC00: $V_M$ = 50%; $V_I$ = GND to $V_{CC}$.
74HCT00: $V_M$ = 1.3 V; $V_I$ = GND to 3 V.

Fig.6 Waveforms showing the input (nA, nB) to output (nY) propagation delays.

## PACKAGE OUTLINES

**DIP14: plastic dual in-line package; 14 leads (300 mil)** **SOT27-1**




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

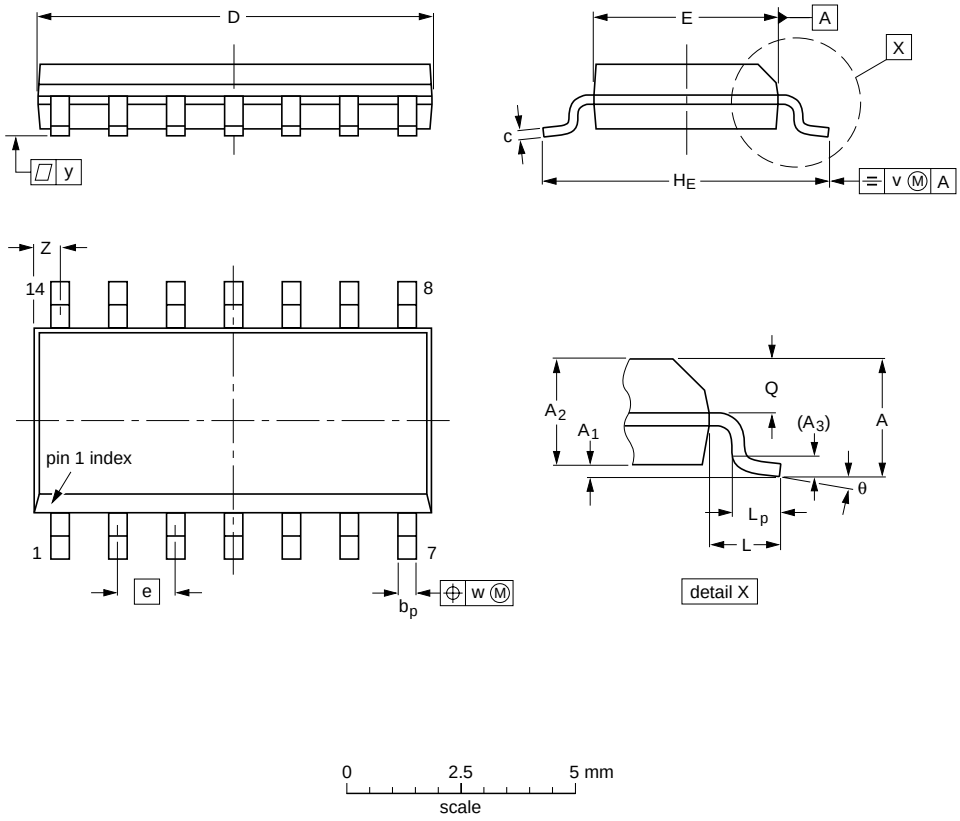
| UNIT | A max. | $A_1$ min. | $A_2$ max. | b | $b_1$ | c | D (1) | E (1) | e | $e_1$ | L | $M_E$ | $M_H$ | w | Z (1) max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 4.2 | 0.51 | 3.2 | 1.73<br>1.13 | 0.53<br>0.38 | 0.36<br>0.23 | 19.50<br>18.55 | 6.48<br>6.20 | 2.54 | 7.62 | 3.60<br>3.05 | 8.25<br>7.80 | 10.0<br>8.3 | 0.254 | 2.2 |
| inches | 0.17 | 0.02 | 0.13 | 0.068<br>0.044 | 0.021<br>0.015 | 0.014<br>0.009 | 0.77<br>0.73 | 0.26<br>0.24 | 0.1 | 0.3 | 0.14<br>0.12 | 0.32<br>0.31 | 0.39<br>0.33 | 0.01 | 0.087 |

**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 | | | |
| SOT27-1 | 050G04 | MO-001 | SC-501-14 | | | ~~99-12-27~~<br>03-02-13 |

**SO14: plastic small outline package; 14 leads; body width 3.9 mm** **SOT108-1**




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

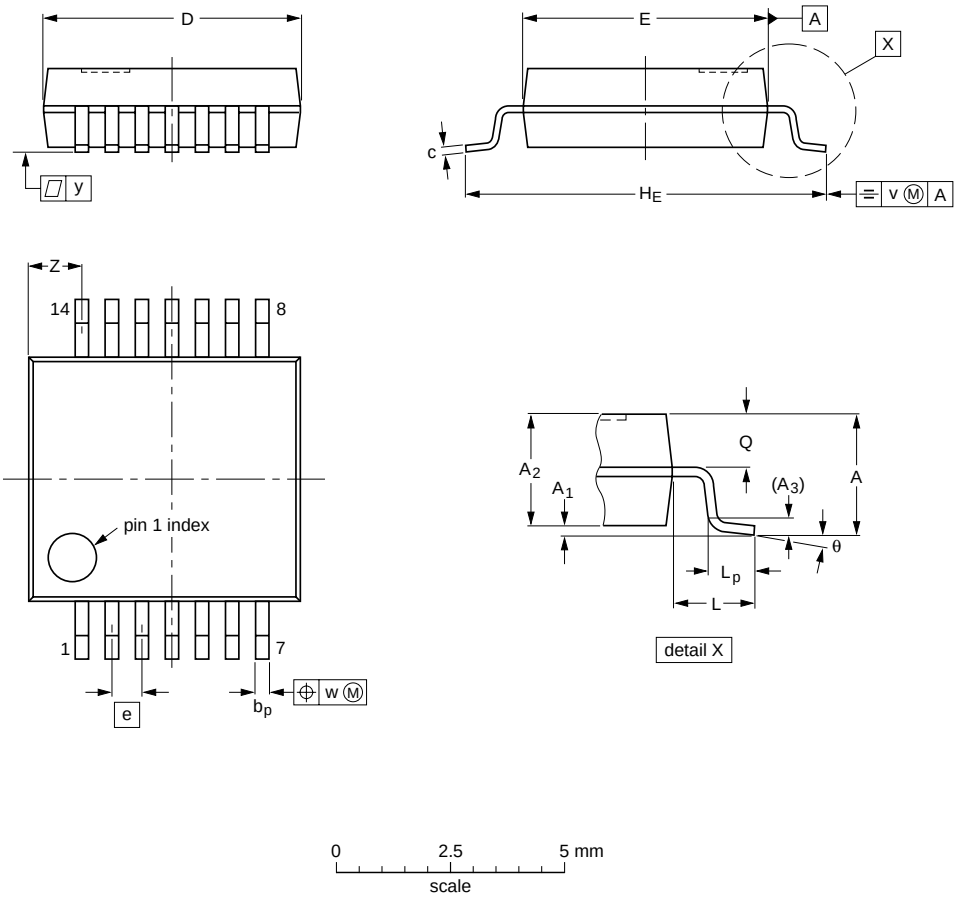
| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | $D^{(1)}$ | $E^{(1)}$ | e | $H_E$ | L | $L_p$ | Q | v | w | y | $Z^{(1)}$ | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.75 | 0.25<br>0.10 | 1.45<br>1.25 | 0.25 | 0.49<br>0.36 | 0.25<br>0.19 | 8.75<br>8.55 | 4.0<br>3.8 | 1.27 | 6.2<br>5.8 | 1.05 | 1.0<br>0.4 | 0.7<br>0.6 | 0.25 | 0.25 | 0.1 | 0.7<br>0.3 | $8^o$<br>$0^o$ |
| inches | 0.069 | 0.010<br>0.004 | 0.057<br>0.049 | 0.01 | 0.019<br>0.014 | 0.0100<br>0.0075 | 0.35<br>0.34 | 0.16<br>0.15 | 0.05 | 0.244<br>0.228 | 0.041 | 0.039<br>0.016 | 0.028<br>0.024 | 0.01 | 0.01 | 0.004 | 0.028<br>0.012 | |

**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 | | | |
| SOT108-1 | 076E06 | MS-012 | | | | ~~99-12-27~~<br>03-02-19 |

**SSOP14: plastic shrink small outline package; 14 leads; body width 5.3 mm** **SOT337-1**




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

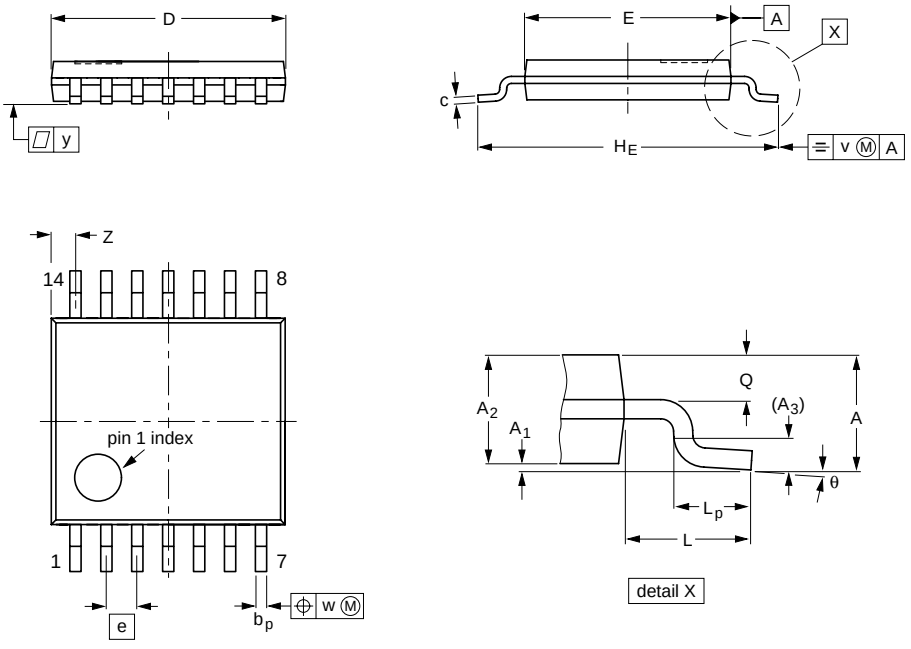
| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | D (1) | E (1) | e | $H_E$ | L | $L_p$ | Q | v | w | y | Z (1) | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 2 | 0.21<br>0.05 | 1.80<br>1.65 | 0.25 | 0.38<br>0.25 | 0.20<br>0.09 | 6.4<br>6.0 | 5.4<br>5.2 | 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 | 1.4<br>0.9 | $8^o$<br>$0^o$ |

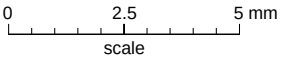
**Note**

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

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT337-1 | | MO-150 | | | | ~~99-12-27~~<br>03-02-19 |

**TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm** **SOT402-1**




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

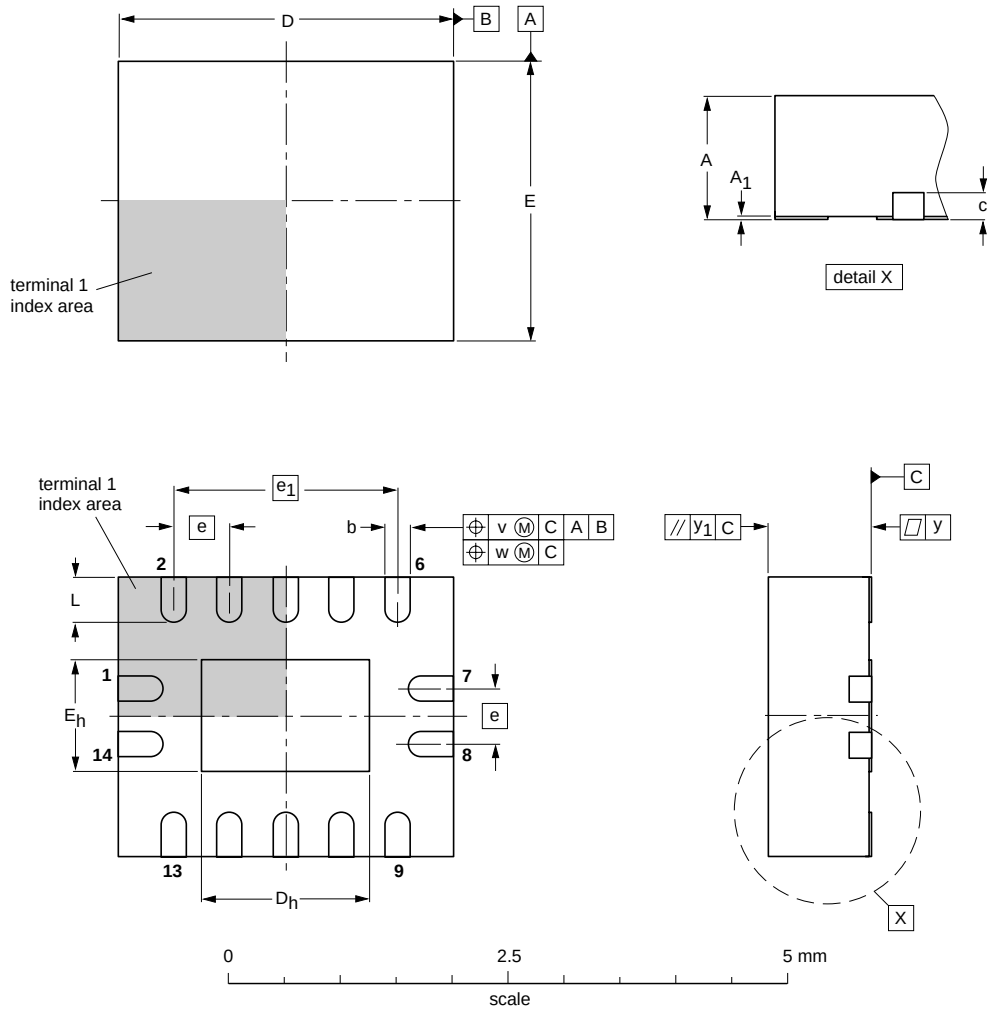
| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | D (1) | E (2) | e | $H_E$ | L | $L_p$ | Q | v | w | y | Z (1) | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1 | 0.15<br>0.05 | 0.95<br>0.80 | 0.25 | 0.30<br>0.19 | 0.2<br>0.1 | 5.1<br>4.9 | 4.5<br>4.3 | 0.65 | 6.6<br>6.2 | 1 | 0.75<br>0.50 | 0.4<br>0.3 | 0.2 | 0.13 | 0.1 | 0.72<br>0.38 | $8^o$<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 | | | |
| SOT402-1 | | MO-153 | | | | ~~99-12-27~~<br>03-02-18 |

**DHVQFN14: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 x 3 x 0.85 mm** **SOT762-1**




**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 | 3.1<br>2.9 | 1.65<br>1.35 | 2.6<br>2.4 | 1.15<br>0.85 | 0.5 | 2 | 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 | | | |
| SOT762-1 | - - - | MO-241 | - - - | | | ~~02-10-17~~<br>03-01-27 |

**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). |

**Notes**

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.

**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 make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

**DISCLAIMERS**

**Life support applications** — 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 licence 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.

# *Philips Semiconductors – a worldwide company*

**Contact information**

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.



Printed in The Netherlands 613508/03/pp17 Date of release: 2003 Jun 30 Document order number: 9397 750 11258

*Let's make things better.*

Philips Semiconductors

PHILIPS