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# 74AHC125; 74AHCT125

Quad buffer/line driver; 3-state

Rev. 6 — 4 September 2023

Product data sheet

## 1. General description

The 74AHC125; 74AHCT125 is a quad buffer/line driver with 3-state outputs controlled by the output enable inputs ( $\overline{nOE}$ ). A HIGH on  $\overline{nOE}$  causes the outputs to assume a high impedance OFF-state. Inputs are overvoltage tolerant. This feature allows the use of these devices as translators in mixed voltage environments.

## 2. Features and benefits

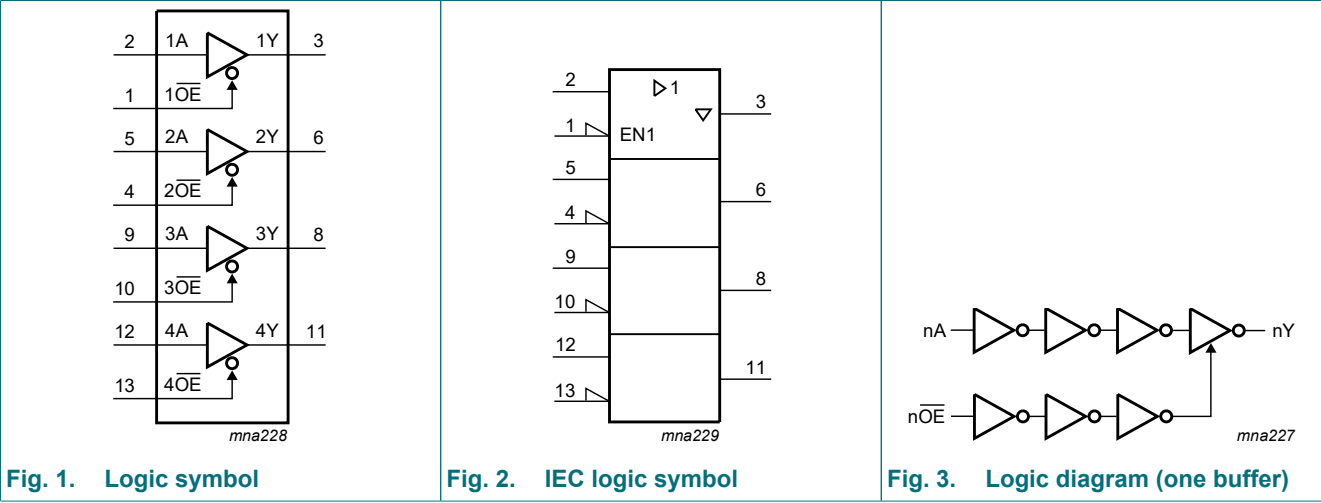
- Wide supply voltage range from 2.0 V to 5.5 V
- Overvoltage tolerant inputs to 5.5 V
- High noise immunity
- CMOS low power dissipation
- Balanced propagation delays
- All inputs have a Schmitt-trigger action
- Input levels:
  - For 74AHC125: CMOS level
  - For 74AHCT125: TTL level
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level A
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Multiple package options
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

## 3. Ordering information

Table 1. Ordering information

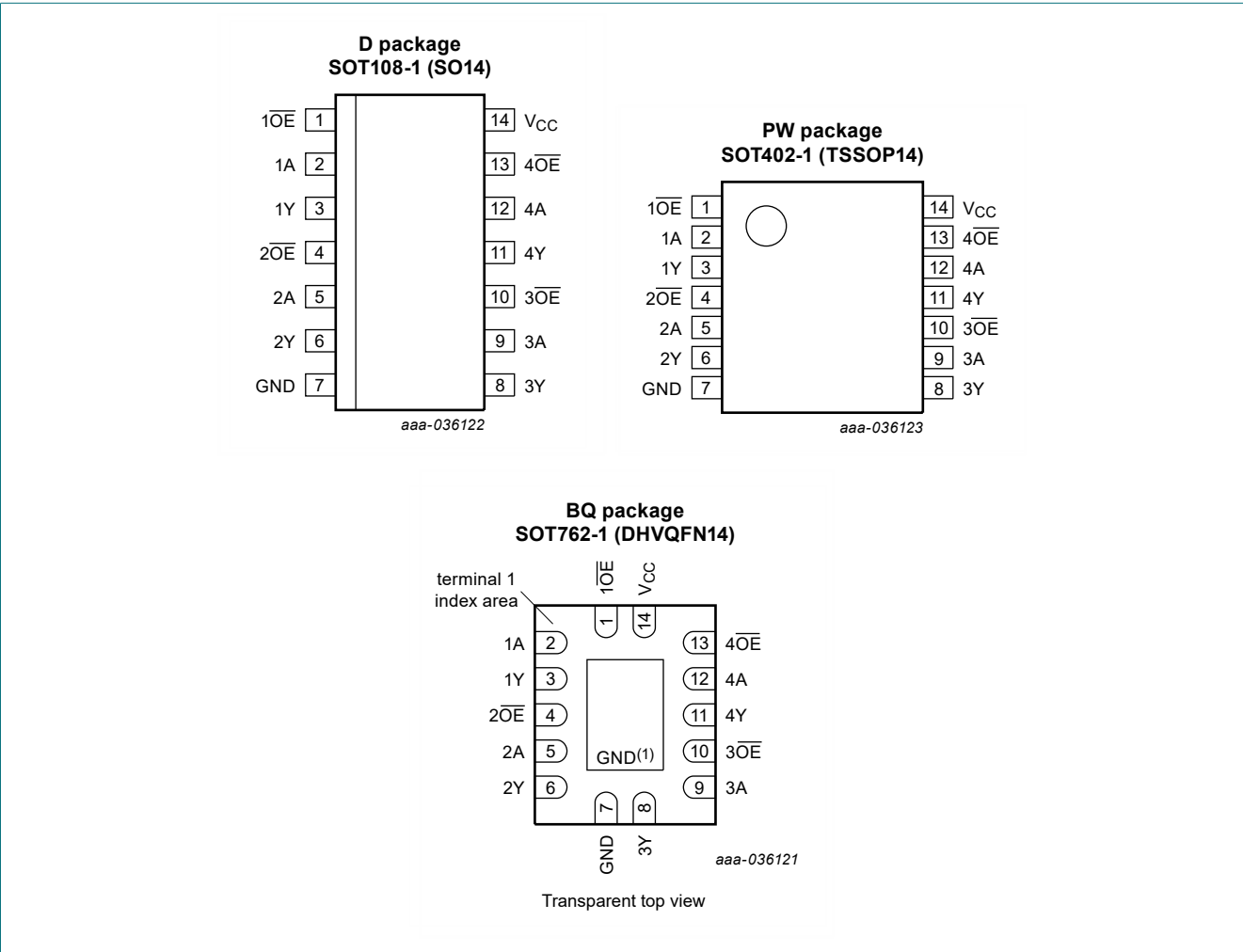
| Type number                                               | Package           |          |                                                                                                                              |                          |
|-----------------------------------------------------------|-------------------|----------|------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                                           | Temperature range | Name     | Description                                                                                                                  | Version                  |
| <a href="#">74AHC125D</a><br><a href="#">74AHCT125D</a>   | -40 °C to +125 °C | SO14     | plastic small outline package; 14 leads; body width 3.9 mm                                                                   | <a href="#">SOT108-1</a> |
| <a href="#">74AHC125PW</a><br><a href="#">74AHCT125PW</a> | -40 °C to +125 °C | TSSOP14  | plastic thin shrink small outline package; 14 leads; body width 4.4 mm                                                       | <a href="#">SOT402-1</a> |
| <a href="#">74AHC125BQ</a><br><a href="#">74AHCT125BQ</a> | -40 °C to +125 °C | DHVQFN14 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 × 3 × 0.85 mm | <a href="#">SOT762-1</a> |

4. Functional diagram



5. Pinning information

5.1. Pinning



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

5.2. Pin description

Table 2. Pin description

| Symbol             | Pin          | Description                      |
|--------------------|--------------|----------------------------------|
| 1OE, 2OE, 3OE, 4OE | 1, 4, 10, 13 | output enable input (active LOW) |
| 1A, 2A, 3A, 4A     | 2, 5, 9, 12  | data input                       |
| 1Y, 2Y, 3Y, 4Y     | 3, 6, 8, 11  | data output                      |
| GND                | 7            | ground (0 V)                     |
| V <sub>CC</sub>    | 14           | supply voltage                   |

6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

| Control | Input | Output |
|---------|-------|--------|
| nOE     | nA    | nY     |
| L       | L     | L      |
|         | H     | H      |
| H       | X     | Z      |

7. Limiting values

Table 4. Limiting values

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

| Symbol           | Parameter               | Conditions                                                              | Min  | Max  | Unit |
|------------------|-------------------------|-------------------------------------------------------------------------|------|------|------|
| V <sub>CC</sub>  | supply voltage          |                                                                         | -0.5 | +7.0 | V    |
| V <sub>I</sub>   | input voltage           |                                                                         | -0.5 | +7.0 | V    |
| I <sub>IK</sub>  | input clamping current  | V <sub>I</sub> < -0.5 V [1]                                             | -20  | -    | mA   |
| I <sub>OK</sub>  | output clamping current | V <sub>O</sub> < -0.5 V or V <sub>O</sub> > V <sub>CC</sub> + 0.5 V [1] | -    | ±20  | mA   |
| I <sub>O</sub>   | output current          | V <sub>O</sub> = -0.5 V to (V <sub>CC</sub> + 0.5 V)                    | -    | ±25  | mA   |
| I <sub>CC</sub>  | supply current          |                                                                         | -    | 75   | mA   |
| I <sub>GND</sub> | ground current          |                                                                         | -75  | -    | mA   |
| T <sub>stg</sub> | storage temperature     |                                                                         | -65  | +150 | °C   |
| P <sub>tot</sub> | total power dissipation | T <sub>amb</sub> = -40 °C to +125 °C [2]                                | -    | 500  | mW   |

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
[2] For SOT108-1 (SO14) package: P<sub>tot</sub> derates linearly with 10.1 mW/K above 100 °C.  
For SOT402-1 (TSSOP14) package: P<sub>tot</sub> derates linearly with 7.3 mW/K above 81 °C.  
For SOT762-1 (DHVQFN14) package: P<sub>tot</sub> derates linearly with 9.6 mW/K above 98 °C.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

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

| Symbol              | Parameter                           | Conditions                                 | 74AHC125 |     |          | 74AHCT125 |     |          | Unit |
|---------------------|-------------------------------------|--------------------------------------------|----------|-----|----------|-----------|-----|----------|------|
|                     |                                     |                                            | Min      | Typ | Max      | Min       | Typ | Max      |      |
| $V_{CC}$            | supply voltage                      |                                            | 2.0      | 5.0 | 5.5      | 4.5       | 5.0 | 5.5      | V    |
| $V_I$               | input voltage                       |                                            | 0        | -   | 5.5      | 0         | -   | 5.5      | 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 | $V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$ | -        | -   | 100      | -         | -   | -        | ns/V |
|                     |                                     | $V_{CC} = 5.0 \text{ V} \pm 0.5 \text{ V}$ | -        | -   | 20       | -         | -   | 20       | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics**

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

| Symbol          | Parameter                 | Conditions                                                                                                                   | 25 °C                 |                                                                                           |       | -40 °C to +85 °C |      | -40 °C to +125 °C |       | Unit |     |    |
|-----------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------|-------|------------------|------|-------------------|-------|------|-----|----|
|                 |                           |                                                                                                                              | Min                   | Typ                                                                                       | Max   | Min              | Max  | Min               | Max   |      |     |    |
| 74AHC125        |                           |                                                                                                                              |                       |                                                                                           |       |                  |      |                   |       |      |     |    |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V                                                                                                      | 1.5                   | -                                                                                         | -     | 1.5              | -    | 1.5               | -     | V    |     |    |
|                 |                           | V <sub>CC</sub> = 3.0 V                                                                                                      | 2.1                   | -                                                                                         | -     | 2.1              | -    | 2.1               | -     | V    |     |    |
|                 |                           | V <sub>CC</sub> = 5.5 V                                                                                                      | 3.85                  | -                                                                                         | -     | 3.85             | -    | 3.85              | -     | V    |     |    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V                                                                                                      | -                     | -                                                                                         | 0.5   | -                | 0.5  | -                 | 0.5   | V    |     |    |
|                 |                           | V <sub>CC</sub> = 3.0 V                                                                                                      | -                     | -                                                                                         | 0.9   | -                | 0.9  | -                 | 0.9   | V    |     |    |
|                 |                           | V <sub>CC</sub> = 5.5 V                                                                                                      | -                     | -                                                                                         | 1.65  | -                | 1.65 | -                 | 1.65  | V    |     |    |
| V <sub>OH</sub> | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                          |                       |                                                                                           |       |                  |      |                   |       |      |     |    |
|                 |                           | I <sub>O</sub> = -50 µA; V <sub>CC</sub> = 2.0 V                                                                             | 1.9                   | 2.0                                                                                       | -     | 1.9              | -    | 1.9               | -     | V    |     |    |
|                 |                           | I <sub>O</sub> = -50 µA; V <sub>CC</sub> = 3.0 V                                                                             | 2.9                   | 3.0                                                                                       | -     | 2.9              | -    | 2.9               | -     | V    |     |    |
|                 |                           | I <sub>O</sub> = -50 µA; V <sub>CC</sub> = 4.5 V                                                                             | 4.4                   | 4.5                                                                                       | -     | 4.4              | -    | 4.4               | -     | V    |     |    |
|                 |                           | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V                                                                            | 2.58                  | -                                                                                         | -     | 2.48             | -    | 2.40              | -     | V    |     |    |
| V <sub>OL</sub> | LOW-level output voltage  | I <sub>O</sub> = -8.0 mA; V <sub>CC</sub> = 4.5 V                                                                            | 3.94                  | -                                                                                         | -     | 3.8              | -    | 3.70              | -     | V    |     |    |
|                 |                           | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                          |                       |                                                                                           |       |                  |      |                   |       |      |     |    |
|                 |                           | I <sub>O</sub> = 50 µA; V <sub>CC</sub> = 2.0 V                                                                              | -                     | 0                                                                                         | 0.1   | -                | 0.1  | -                 | 0.1   | V    |     |    |
|                 |                           | I <sub>O</sub> = 50 µA; V <sub>CC</sub> = 3.0 V                                                                              | -                     | 0                                                                                         | 0.1   | -                | 0.1  | -                 | 0.1   | V    |     |    |
|                 |                           | I <sub>O</sub> = 50 µA; V <sub>CC</sub> = 4.5 V                                                                              | -                     | 0                                                                                         | 0.1   | -                | 0.1  | -                 | 0.1   | V    |     |    |
| I <sub>OZ</sub> | OFF-state output current  | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V                                                                             | -                     | -                                                                                         | 0.36  | -                | 0.44 | -                 | 0.55  | V    |     |    |
|                 |                           | I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V                                                                             | -                     | -                                                                                         | 0.36  | -                | 0.44 | -                 | 0.55  | V    |     |    |
|                 |                           | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>O</sub> = V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 5.5 V | -                     | -                                                                                         | ±0.25 | -                | ±2.5 | -                 | ±10.0 | µA   |     |    |
|                 |                           | I <sub>I</sub>                                                                                                               | input leakage current | V <sub>I</sub> = 5.5 V or GND;<br>V <sub>CC</sub> = 0 V to 5.5 V                          | -     | -                | 0.1  | -                 | 1.0   | -    | 2.0 | µA |
|                 |                           | I <sub>CC</sub>                                                                                                              | supply current        | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 5.5 V | -     | -                | 2.0  | -                 | 20    | -    | 40  | µA |

| Symbol           | Parameter                 | Conditions                                                                                                                                           | 25 °C |     |            | -40 °C to +85 °C |           | -40 °C to +125 °C |            | Unit          |
|------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|------------|------------------|-----------|-------------------|------------|---------------|
|                  |                           |                                                                                                                                                      | Min   | Typ | Max        | Min              | Max       | Min               | Max        |               |
| $C_I$            | input capacitance         |                                                                                                                                                      | -     | 3.0 | 10         | -                | 10        | -                 | 10         | pF            |
| $C_O$            | output capacitance        |                                                                                                                                                      | -     | 4.0 | -          | -                | -         | -                 | -          | pF            |
| <b>74AHCT125</b> |                           |                                                                                                                                                      |       |     |            |                  |           |                   |            |               |
| $V_{IH}$         | HIGH-level input voltage  | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$                                                                                                           | 2.0   | -   | -          | 2.0              | -         | 2.0               | -          | V             |
| $V_{IL}$         | LOW-level input voltage   | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$                                                                                                           | -     | -   | 0.8        | -                | 0.8       | -                 | 0.8        | V             |
| $V_{OH}$         | HIGH-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$                                                                                            |       |     |            |                  |           |                   |            |               |
|                  |                           | $I_O = -50 \mu\text{A}$                                                                                                                              | 4.4   | 4.5 | -          | 4.4              | -         | 4.4               | -          | V             |
|                  |                           | $I_O = -8.0 \text{ mA}$                                                                                                                              | 3.94  | -   | -          | 3.8              | -         | 3.70              | -          | V             |
| $V_{OL}$         | LOW-level output voltage  | $V_I = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$                                                                                            |       |     |            |                  |           |                   |            |               |
|                  |                           | $I_O = 50 \mu\text{A}$                                                                                                                               | -     | 0   | 0.1        | -                | 0.1       | -                 | 0.1        | V             |
|                  |                           | $I_O = 8.0 \text{ mA}$                                                                                                                               | -     | -   | 0.36       | -                | 0.44      | -                 | 0.55       | V             |
| $I_{OZ}$         | OFF-state output current  | $V_I = V_{IH} \text{ or } V_{IL};$<br>$V_O = V_{CC} \text{ or GND};$<br>$V_{CC} = 5.5 \text{ V}$                                                     | -     | -   | $\pm 0.25$ | -                | $\pm 2.5$ | -                 | $\pm 10.0$ | $\mu\text{A}$ |
| $I_I$            | input leakage current     | $V_I = 5.5 \text{ V or GND};$<br>$V_{CC} = 0 \text{ V to } 5.5 \text{ V}$                                                                            | -     | -   | 0.1        | -                | 1.0       | -                 | 2.0        | $\mu\text{A}$ |
| $I_{CC}$         | supply current            | $V_I = V_{CC} \text{ or GND}; I_O = 0 \text{ A};$<br>$V_{CC} = 5.5 \text{ V}$                                                                        | -     | -   | 2.0        | -                | 20        | -                 | 40         | $\mu\text{A}$ |
| $\Delta I_{CC}$  | additional supply current | per input pin;<br>$V_I = V_{CC} - 2.1 \text{ V}; I_O = 0 \text{ A};$<br>other pins at $V_{CC}$ or GND;<br>$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$ | -     | -   | 1.35       | -                | 1.5       | -                 | 1.5        | mA            |
| $C_I$            | input capacitance         |                                                                                                                                                      | -     | 3.0 | 10         | -                | 10        | -                 | 10         | pF            |
| $C_O$            | output capacitance        |                                                                                                                                                      | -     | 4.0 | -          | -                | -         | -                 | -          | pF            |

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

$GND = 0\text{ V}$ ; For test circuit see [Fig. 6](#).

| Symbol           | Parameter                     | Conditions                                                                                  | 25 °C |        |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|------------------|-------------------------------|---------------------------------------------------------------------------------------------|-------|--------|------|------------------|------|-------------------|------|------|
|                  |                               |                                                                                             | Min   | Typ[1] | Max  | Min              | Max  | Min               | Max  |      |
| 74AHC125         |                               |                                                                                             |       |        |      |                  |      |                   |      |      |
| t <sub>pd</sub>  | propagation delay             | nA to nY; see Fig. 4 [2]                                                                    |       |        |      |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                            |       |        |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 4.4    | 8.0  | 1.0              | 9.5  | 1.0               | 11.5 | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 6.2    | 11.5 | 1.0              | 13.0 | 1.0               | 14.5 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                                            |       |        |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 3.0    | 5.5  | 1.0              | 6.5  | 1.0               | 7.0  | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 4.3    | 7.5  | 1.0              | 8.5  | 1.0               | 9.5  | ns   |
| t <sub>en</sub>  | enable time                   | nOE to nY; see Fig. 5 [2]                                                                   |       |        |      |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                            |       |        |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 4.7    | 8.0  | 1.0              | 9.5  | 1.0               | 11.5 | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 6.8    | 11.5 | 1.0              | 13.0 | 1.0               | 14.5 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                                            |       |        |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 3.3    | 5.1  | 1.0              | 6.0  | 1.0               | 6.5  | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 4.7    | 7.1  | 1.0              | 8.0  | 1.0               | 9.0  | ns   |
| t <sub>dis</sub> | disable time                  | nOE to nY; see Fig. 5 [2]                                                                   |       |        |      |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                            |       |        |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 6.7    | 9.7  | 1.0              | 11.5 | 1.0               | 12.5 | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 9.6    | 13.2 | 1.0              | 15.0 | 1.0               | 16.5 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                                            |       |        |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 4.8    | 6.8  | 1.0              | 8.0  | 1.0               | 8.5  | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 6.8    | 8.8  | 1.0              | 10.0 | 1.0               | 11.0 | ns   |
| C <sub>PD</sub>  | power dissipation capacitance | C <sub>L</sub> = 50 pF; f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [3] | -     | 10     | -    | -                | -    | -                 | -    | pF   |



| Symbol           | Parameter                     | Conditions                                                                                  | 25 °C |        |     | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|------------------|-------------------------------|---------------------------------------------------------------------------------------------|-------|--------|-----|------------------|------|-------------------|------|------|
|                  |                               |                                                                                             | Min   | Typ[1] | Max | Min              | Max  | Min               | Max  |      |
| 74AHCT125        |                               |                                                                                             |       |        |     |                  |      |                   |      |      |
| t <sub>pd</sub>  | propagation delay             | nA to nY; see Fig. 4 [2]                                                                    |       |        |     |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                                            |       |        |     |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 3.0    | 5.5 | 1.0              | 6.5  | 1.0               | 7.0  | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 4.3    | 7.5 | 1.0              | 8.5  | 1.0               | 9.5  | ns   |
| t <sub>en</sub>  | enable time                   | nOE to nY; see Fig. 5 [2]                                                                   |       |        |     |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                                            |       |        |     |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 3.4    | 5.1 | 1.0              | 6.0  | 1.0               | 6.5  | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 4.9    | 7.3 | 1.0              | 8.3  | 1.0               | 9.5  | ns   |
| t <sub>dis</sub> | disable time                  | nOE to nY; see Fig. 5 [2]                                                                   |       |        |     |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                                            |       |        |     |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF                                                                      | -     | 4.5    | 6.8 | 1.0              | 8.0  | 1.0               | 8.5  | ns   |
|                  |                               | C <sub>L</sub> = 50 pF                                                                      | -     | 6.5    | 8.8 | 1.0              | 10.0 | 1.0               | 11.0 | ns   |
| C <sub>PD</sub>  | power dissipation capacitance | C <sub>L</sub> = 50 pF; f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [3] | -     | 12     | -   | -                | -    | -                 | -    | pF   |

[1] Typical values are measured at nominal supply voltage ( $V_{CC} = 3.3 \text{ V}$  and  $V_{CC} = 5.0 \text{ V}$ ).

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

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

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

[3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where:

$f_i$  = input frequency in MHz,  $f_o$  = output frequency in MHz

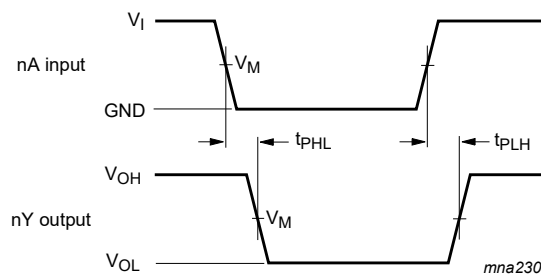
$C_L$  = output load capacitance in pF

$V_{CC}$  = supply voltage in Volts

$N$  = number of inputs switching

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

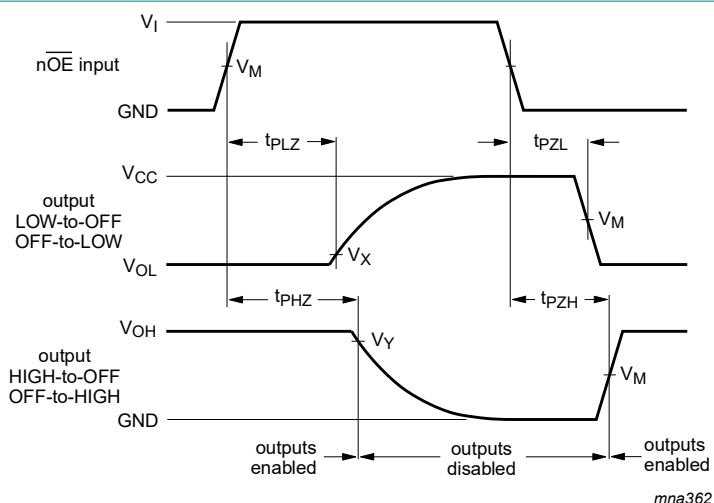
## 10.1. Waveforms and test circuit



Measurement points are given in Table 8.

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

**Fig. 4. Propagation delay input (nA) to output (nY)**



Measurement points are given in [Table 8](#).

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

**Fig. 5. Enable and disable times**

### Table 8. Measurement points

| Type      | Input          | Output      |                         |                         |
|-----------|----------------|-------------|-------------------------|-------------------------|
|           | $V_M$          | $V_M$       | $V_X$                   | $V_Y$                   |
| 74AHC125  | $0.5V_{CC}$    | $0.5V_{CC}$ | $V_{OL} + 0.3\text{ V}$ | $V_{OL} - 0.3\text{ V}$ |
| 74AHCT125 | $1.5\text{ V}$ | $0.5V_{CC}$ | $V_{OL} + 0.3\text{ V}$ | $V_{OL} - 0.3\text{ V}$ |

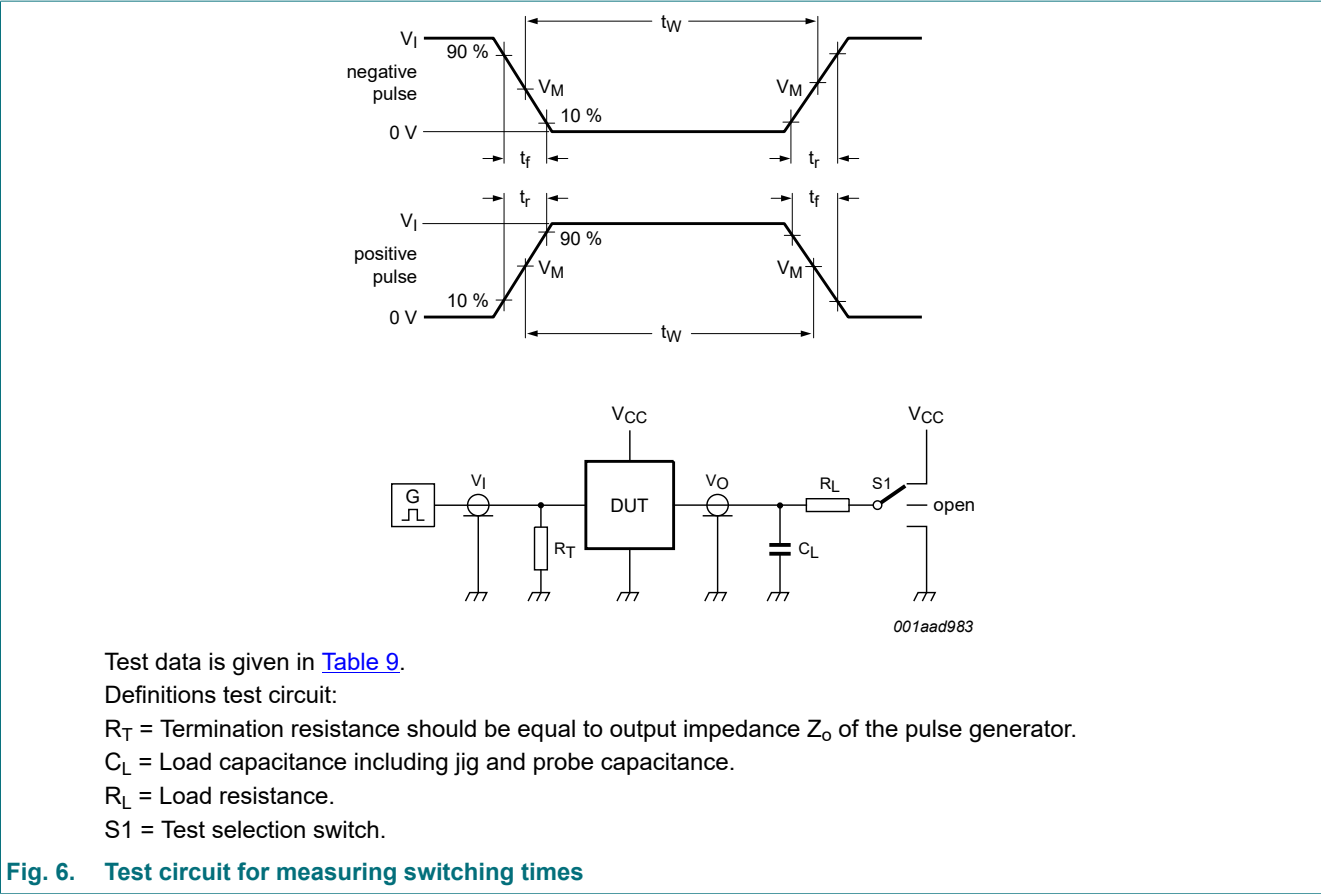


Fig. 6. Test circuit for measuring switching times

Table 9. Test data

| Type      | Input    |                       | Load         |              | S1 position        |                    |                    |
|-----------|----------|-----------------------|--------------|--------------|--------------------|--------------------|--------------------|
|           | $V_I$    | $t_r, t_f$            | $C_L$        | $R_L$        | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 74AHC125  | $V_{CC}$ | $\leq 3.0 \text{ ns}$ | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |
| 74AHCT125 | 3.0 V    | $\leq 3.0 \text{ ns}$ | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |

11. Package outline

SO14: plastic small outline package; 14 leads; body width 3.9 mm

SOT108-1

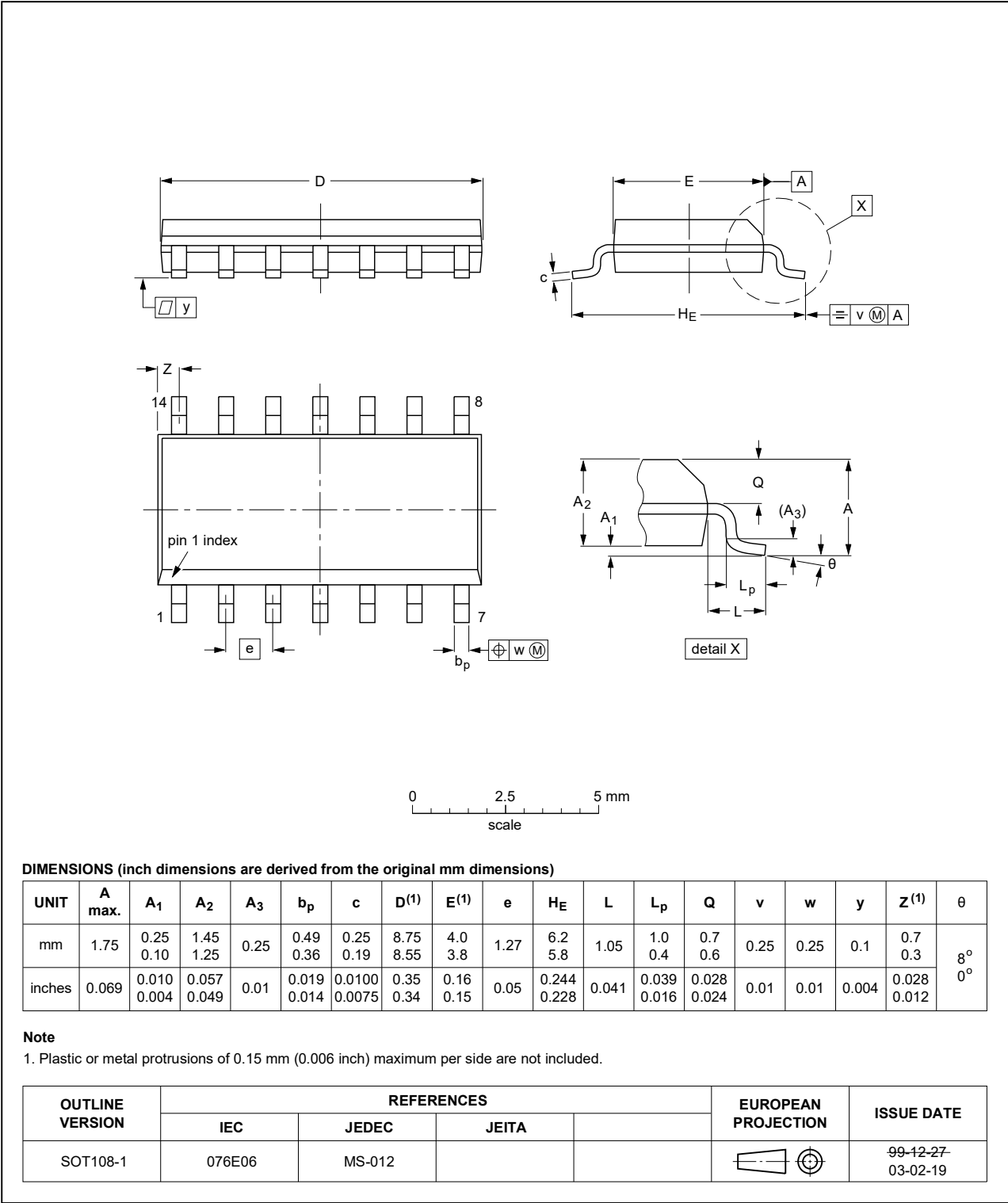


Fig. 7. Package outline SOT108-1 (SO14)

TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm

SOT402-1

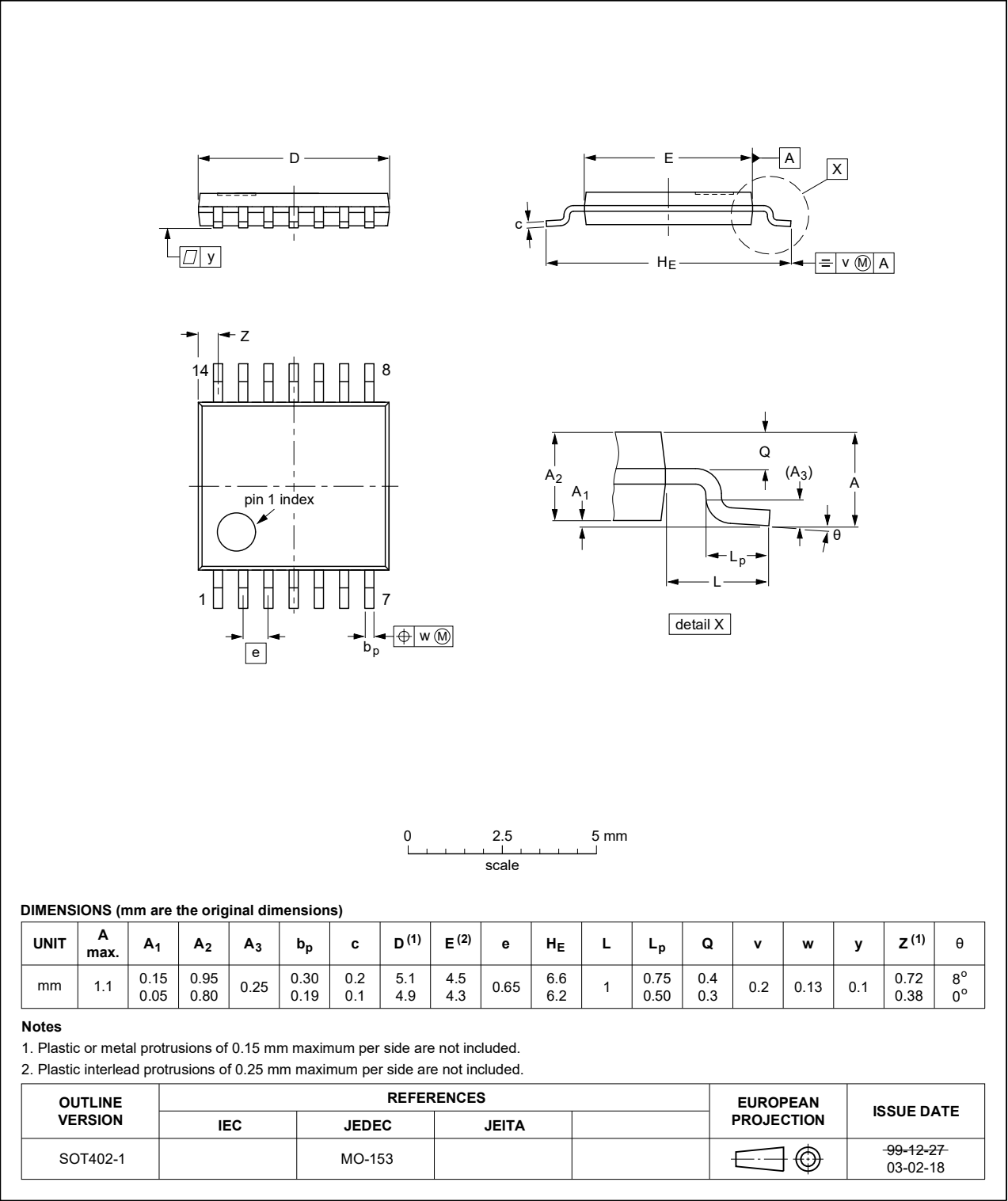


Fig. 8. Package outline SOT402-1 (TSSOP14)

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

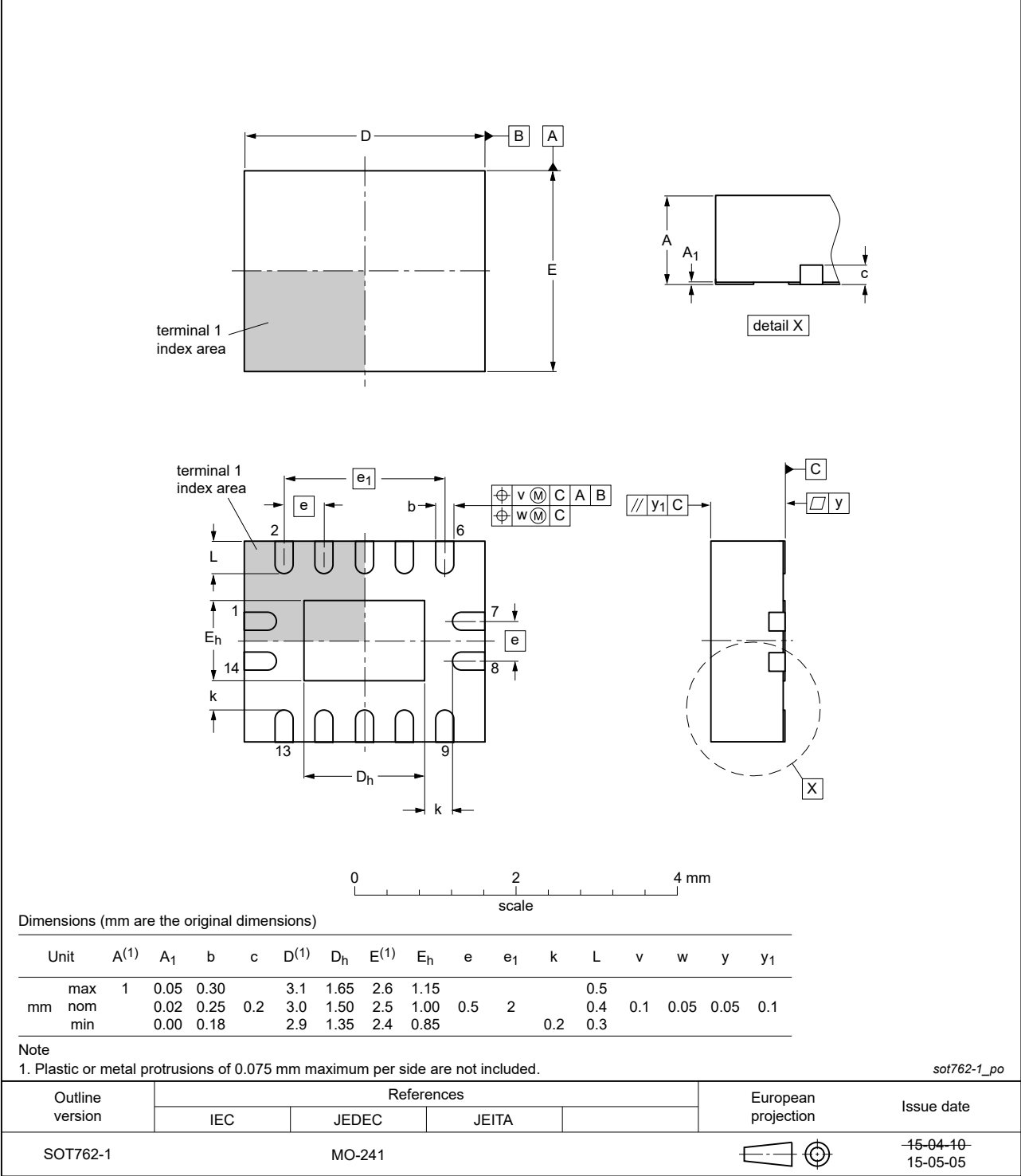


Fig. 9. Package outline SOT762-1 (DHVQFN14)

## 12. Abbreviations

Table 10. Abbreviations

| Acronym | Description                             |
|---------|-----------------------------------------|
| CDM     | Charge-Device Model                     |
| CMOS    | Complementary Metal Oxide Semiconductor |
| ESD     | ElectroStatic Discharge                 |
| HBM     | Human Body Model                        |
| TTL     | Transistor-Transistor Logic             |

## 13. Revision history

Table 11. Revision history

| Document ID       | Release date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Data sheet status     | Change notice | Supersedes        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------------|
| 74AHC_AHCT125 v.6 | 20230904                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Product data sheet    | -             | 74AHC_AHCT125 v.5 |
| Modifications:    | <ul style="list-style-type: none"> <li>• <a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |               |                   |
| 74AHC_AHCT125 v.5 | 20200612                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Product data sheet    | -             | 74AHC_AHCT125 v.4 |
| Modifications:    | <ul style="list-style-type: none"> <li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• <a href="#">Section 1</a> and <a href="#">Section 2</a> updated.</li> <li>• <a href="#">Table 4</a>: Derating values for <math>P_{tot}</math> total power dissipation have been updated.</li> <li>• <a href="#">Table 6</a>: Conditions for <math>I_{OZ}</math> corrected.</li> <li>• Package outline drawing of SOT762-1 (<a href="#">Fig. 9</a>) updated.</li> </ul> |                       |               |                   |
| 74AHC_AHCT125 v.4 | 20080111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Product data sheet    | -             | 74AHC_AHCT125 v.3 |
| Modifications:    | <ul style="list-style-type: none"> <li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• <a href="#">Section 3</a>: DHVQFN14 package added.</li> <li>• <a href="#">Section 7</a>: derating values added for DHVQFN14 package.</li> <li>• <a href="#">Section 11</a>: outline drawing added for DHVQFN14 package.</li> </ul>                                                                                                                       |                       |               |                   |
| 74AHC_AHCT125 v.3 | 20060324                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Product data sheet    | -             | 74AHC_AHCT125 v.2 |
| 74AHC_AHCT125 v.2 | 19990927                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Product specification | -             | 74AHC_AHCT125 v.1 |
| 74AHC_AHCT125 v.1 | 19990111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Product specification | -             | -                 |

## 14. Legal information

### 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 <https://www.nexperia.com>.

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