

# 74LVC132A

## Quad 2-input NAND Schmitt trigger

Rev. 4 — 6 July 2020

Product data sheet

## 1. General description

The 74LVC132A provides four 2-input NAND gates with Schmitt trigger inputs. It is capable of transforming slowly-changing input signals into sharply defined, jitter-free output signals.

The inputs switch at different points for positive and negative-going signals. The difference between the positive voltage  $V_{T+}$  and the negative voltage  $V_{T-}$  is defined as the input hysteresis voltage  $V_H$ .

Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V environment.

## 2. Features and benefits

- Wide supply voltage range from 1.2 V to 3.6 V
- 5 V tolerant inputs for interfacing with 5 V logic
- CMOS low-power consumption
- Direct interface with TTL levels
- Unlimited input rise and fall times
- Inputs accept voltages up to 5.5 V
- Complies with JEDEC standard JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-B exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

## 3. Applications

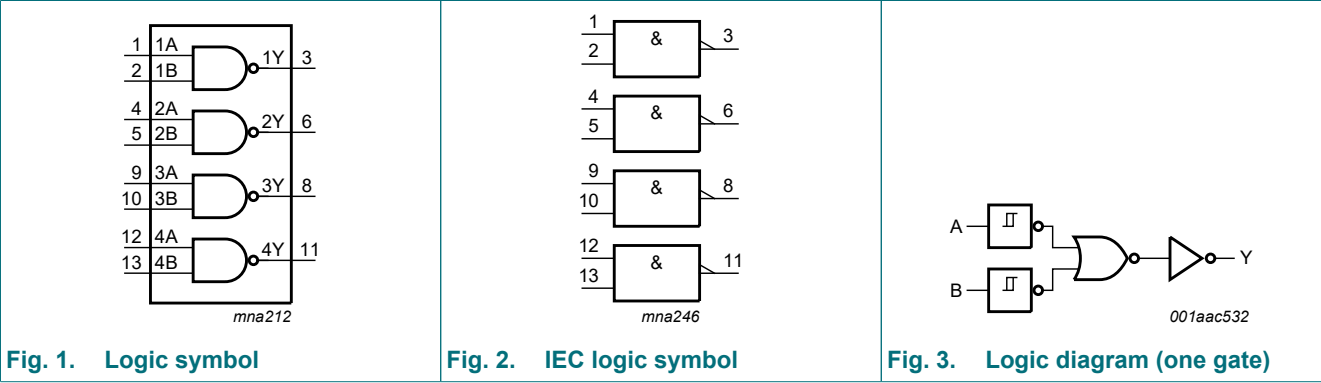
- Wave and pulse shapers for highly noisy environments
- Astable multivibrator
- Monostable multivibrator.

## 4. Ordering information

Table 1. Ordering information

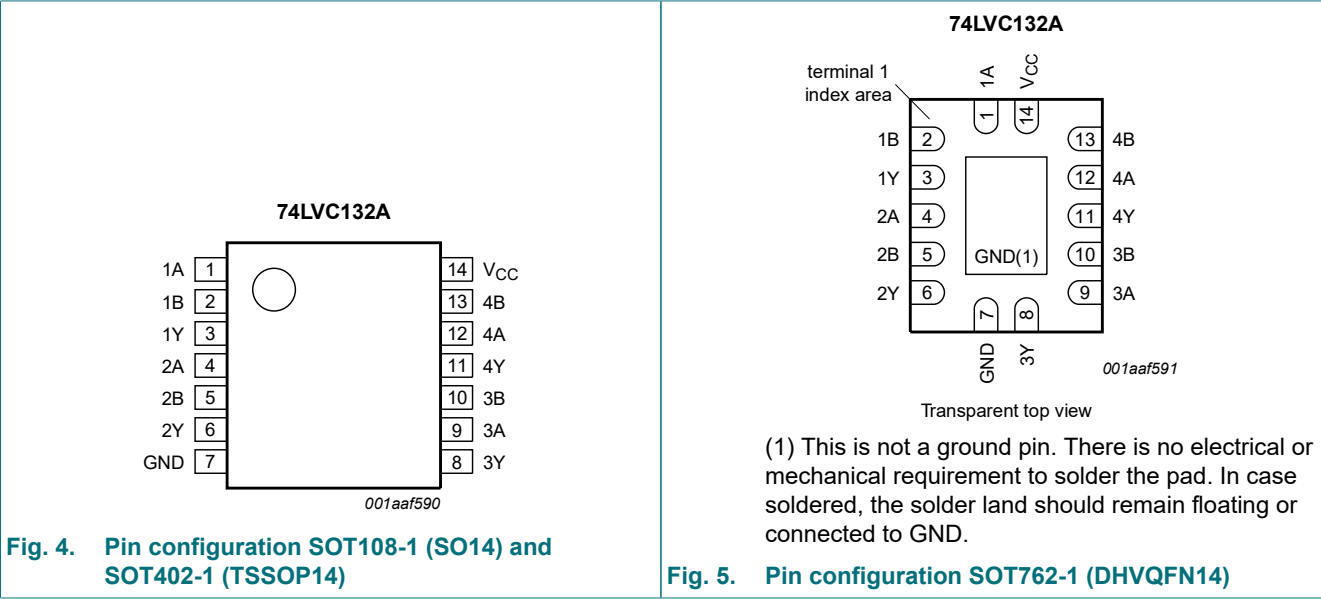
| Type number | Package           |          |                                                                                                                              |          |
|-------------|-------------------|----------|------------------------------------------------------------------------------------------------------------------------------|----------|
|             | Temperature range | Name     | Description                                                                                                                  | Version  |
| 74LVC132AD  | -40 °C to +125 °C | SO14     | plastic small outline package; 14 leads; body width 3.9 mm                                                                   | SOT108-1 |
| 74LVC132APW | -40 °C to +125 °C | TSSOP14  | plastic thin shrink small outline package; 14 leads; body width 4.4 mm                                                       | SOT402-1 |
| 74LVC132ABQ | -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 | SOT762-1 |

5. Functional diagram



6. Pinning information

6.1. Pinning



6.2. Pin description

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

## 7. Functional description

**Table 3. Function table**

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

| Input |    | Output |
|-------|----|--------|
| nA    | nB | nY     |
| L     | L  | H      |
| L     | H  | H      |
| H     | L  | H      |
| H     | H  | L      |

## 8. Limiting values

**Table 4. Limiting values**

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

| Symbol    | Parameter               | Conditions                        | Min  | Max            | Unit |
|-----------|-------------------------|-----------------------------------|------|----------------|------|
| $V_{CC}$  | supply voltage          |                                   | -0.5 | +6.5           | V    |
| $V_I$     | input voltage           | [1]                               | -0.5 | +6.5           | V    |
| $V_O$     | output voltage          | [2]                               | -0.5 | $V_{CC} + 0.5$ | V    |
| $I_{IK}$  | input clamping current  | $V_I < 0$ V                       | -50  | -              | mA   |
| $I_{OK}$  | output clamping current | $V_O > V_{CC}$ or $V_O < 0$ V     | -    | ±50            | mA   |
| $I_O$     | output current          | $V_O = 0$ V to $V_{CC}$           | -    | ±50            | mA   |
| $I_{CC}$  | supply current          |                                   | -    | 100            | mA   |
| $I_{GND}$ | ground current          |                                   | -100 | -              | mA   |
| $T_{stg}$ | storage temperature     |                                   | -65  | +150           | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40$ °C to +125 °C [3] | -    | 500            | mW   |

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

[2] The output voltage ratings may be exceeded if the output current ratings are observed.

[3] For SOT108-1 (SO14) package:  $P_{tot}$  derates linearly with 10.1 mW/K above 100 °C.  
 For SOT402-1 (TSSOP14) package:  $P_{tot}$  derates linearly with 7.3 mW/K above 81 °C.  
 For SOT762-1 (DHVQFN14) package:  $P_{tot}$  derates linearly with 9.6 mW/K above 98 °C.

## 9. Recommended operating conditions

**Table 5. Recommended operating conditions**

| Symbol    | Parameter           | Conditions | Min  | Typ | Max      | Unit |
|-----------|---------------------|------------|------|-----|----------|------|
| $V_{CC}$  | supply voltage      |            | 1.65 | -   | 3.6      | V    |
|           |                     | functional | 1.2  | -   | -        | V    |
| $V_I$     | input voltage       |            | 0    | -   | 5.5      | V    |
| $V_O$     | output voltage      |            | 0    | -   | $V_{CC}$ | V    |
| $T_{amb}$ | ambient temperature |            | -40  | -   | +125     | °C   |

## 10. Static characteristics

**Table 6. Static characteristics**

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

| Symbol                                     | Parameter                 | Conditions                                                                                                      | Min                    | Typ [1] | Max  | Unit |
|--------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------|---------|------|------|
| <b>T<sub>amb</sub> = -40 °C to +85 °C</b>  |                           |                                                                                                                 |                        |         |      |      |
| V <sub>OH</sub>                            | HIGH-level output voltage | V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</sub>                                                             |                        |         |      |      |
|                                            |                           | I <sub>O</sub> = -100 µA; V <sub>CC</sub> = 1.65 V to 3.6 V                                                     | V <sub>CC</sub> - 0.2  | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V                                                                | V <sub>CC</sub> - 0.45 | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -8 mA; V <sub>CC</sub> = 2.3 V                                                                 | V <sub>CC</sub> - 0.5  | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V                                                                | V <sub>CC</sub> - 0.5  | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -18 mA; V <sub>CC</sub> = 3.0 V                                                                | V <sub>CC</sub> - 0.6  | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -24 mA; V <sub>CC</sub> = 3.0 V                                                                | V <sub>CC</sub> - 0.8  | -       | -    | V    |
| V <sub>OL</sub>                            | LOW-level output voltage  | V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</sub>                                                             |                        |         |      |      |
|                                            |                           | I <sub>O</sub> = 100 µA; V <sub>CC</sub> = 1.65 V to 3.6 V                                                      | -                      | -       | 0.2  | V    |
|                                            |                           | I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V                                                                 | -                      | -       | 0.45 | V    |
|                                            |                           | I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V                                                                  | -                      | -       | 0.6  | V    |
|                                            |                           | I <sub>O</sub> = 12 mA; V <sub>CC</sub> = 2.7 V                                                                 | -                      | -       | 0.4  | V    |
|                                            |                           | I <sub>O</sub> = 24 mA; V <sub>CC</sub> = 3.0 V                                                                 | -                      | -       | 0.55 | V    |
| I <sub>I</sub>                             | input leakage current     | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = 5.5 V or GND                                                          | -                      | ±0.1    | ±5   | µA   |
| I <sub>CC</sub>                            | supply current            | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A                          | -                      | 0.1     | 10   | µA   |
| ΔI <sub>CC</sub>                           | additional supply current | per input pin; V <sub>CC</sub> = 2.7 V to 3.6 V; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A | -                      | 5       | 500  | µA   |
| C <sub>I</sub>                             | input capacitance         | V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND to V <sub>CC</sub>                                         | -                      | 4.0     | -    | pF   |
| <b>T<sub>amb</sub> = -40 °C to +125 °C</b> |                           |                                                                                                                 |                        |         |      |      |
| V <sub>OH</sub>                            | HIGH-level output voltage | V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</sub>                                                             |                        |         |      |      |
|                                            |                           | I <sub>O</sub> = -100 µA; V <sub>CC</sub> = 1.65 V to 3.6 V                                                     | V <sub>CC</sub> - 0.3  | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V                                                                | V <sub>CC</sub> - 0.6  | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -8 mA; V <sub>CC</sub> = 2.3 V                                                                 | V <sub>CC</sub> - 0.65 | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V                                                                | V <sub>CC</sub> - 0.65 | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -18 mA; V <sub>CC</sub> = 3.0 V                                                                | V <sub>CC</sub> - 0.75 | -       | -    | V    |
|                                            |                           | I <sub>O</sub> = -24 mA; V <sub>CC</sub> = 3.0 V                                                                | V <sub>CC</sub> - 1    | -       | -    | V    |
| V <sub>OL</sub>                            | LOW-level output voltage  | V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</sub>                                                             |                        |         |      |      |
|                                            |                           | I <sub>O</sub> = 100 µA; V <sub>CC</sub> = 1.65 V to 3.6 V                                                      | -                      | -       | 0.3  | V    |
|                                            |                           | I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V                                                                 | -                      | -       | 0.65 | V    |
|                                            |                           | I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V                                                                  | -                      | -       | 0.8  | V    |
|                                            |                           | I <sub>O</sub> = 12 mA; V <sub>CC</sub> = 2.7 V                                                                 | -                      | -       | 0.6  | V    |
|                                            |                           | I <sub>O</sub> = 24 mA; V <sub>CC</sub> = 3.0 V                                                                 | -                      | -       | 0.8  | V    |
| I <sub>I</sub>                             | input leakage current     | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = 5.5 V or GND                                                          | -                      | -       | ±20  | µA   |
| I <sub>CC</sub>                            | supply current            | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A                          | -                      | -       | 40   | µA   |
| ΔI <sub>CC</sub>                           | additional supply current | per input pin; V <sub>CC</sub> = 2.7 V to 3.6 V; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A | -                      | -       | 5    | mA   |

[1] All typical values are measured at V<sub>CC</sub> = 3.3 V (unless stated otherwise) and T<sub>amb</sub> = 25 °C.

## 11. Dynamic characteristics

**Table 7. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V). For test circuit see Fig. 7.

| Symbol      | Parameter                     | Conditions                                    | -40 °C to +85 °C |         |      | -40 °C to +125 °C |      | Unit |
|-------------|-------------------------------|-----------------------------------------------|------------------|---------|------|-------------------|------|------|
|             |                               |                                               | Min              | Typ [1] | Max  | Min               | Max  |      |
| $t_{pd}$    | propagation delay             | nA, nB to nY; see Fig. 6 [2]                  |                  |         |      |                   |      |      |
|             |                               | $V_{CC} = 1.2 \text{ V}$                      | -                | 18.0    | -    | -                 | -    | ns   |
|             |                               | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$  | 2.0              | 7.2     | 12.8 | 2.0               | 16.0 | ns   |
|             |                               | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$    | 1.5              | 4.0     | 7.6  | 1.5               | 9.6  | ns   |
|             |                               | $V_{CC} = 2.7 \text{ V}$                      | 1.5              | 3.8     | 7.6  | 1.5               | 9.6  | ns   |
|             |                               | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$    | 1.5              | 3.4     | 6.4  | 1.5               | 8.0  | ns   |
| $t_{sk(o)}$ | output skew time              | [3]                                           | -                | -       | 1.0  | -                 | 1.5  | ns   |
| $C_{PD}$    | power dissipation capacitance | per buffer; $V_I = \text{GND to } V_{CC}$ [4] |                  |         |      |                   |      |      |
|             |                               | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$  | -                | 10.5    | -    | -                 | -    | pF   |
|             |                               | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$    | -                | 10.8    | -    | -                 | -    | pF   |
|             |                               | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$    | -                | 11.4    | -    | -                 | -    | pF   |

[1] Typical values are measured at  $T_{amb} = 25 \text{ °C}$  and  $V_{CC} = 1.2 \text{ V}$ ,  $1.8 \text{ V}$ ,  $2.5 \text{ V}$ ,  $2.7 \text{ V}$ , and  $3.3 \text{ V}$  respectively.

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

[3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

[4]  $C_{PD}$  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;

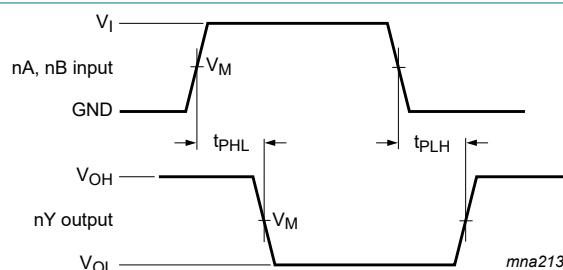
$N$  = number of inputs switching;

$C_L$  = output load capacitance in pF;

$V_{CC}$  = supply voltage in V;

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

### 11.1. Waveforms and test circuit

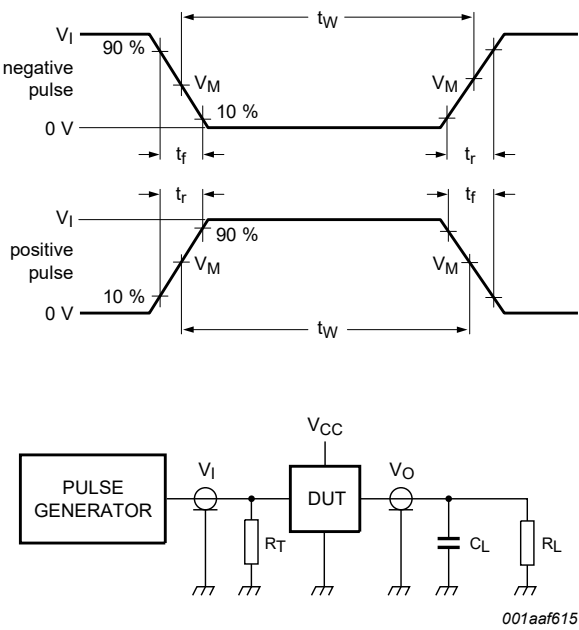


$V_M = 1.5 \text{ V}$  at  $V_{CC} \geq 2.7 \text{ V}$ .

$V_M = 0.5 \times V_{CC}$  at  $V_{CC} < 2.7 \text{ V}$ .

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

**Fig. 6. The input (nA, nB) to output (nY) propagation delays**



Test data is given in [Table 8](#). Definitions for test circuit:  
 $R_L$  = Load resistance  
 $C_L$  = Load capacitance including jig and probe capacitance  
 $R_T$  = Termination resistance should be equal to output impedance  $Z_o$  of the pulse generator.

Fig. 7. Test circuit for measuring switching times

Table 8. Test data

| Supply voltage   | Input    |               | Load  |              |
|------------------|----------|---------------|-------|--------------|
|                  | $V_I$    | $t_r, t_f$    | $C_L$ | $R_L$        |
| 1.2 V            | $V_{CC}$ | $\leq 2$ ns   | 30 pF | 1 k $\Omega$ |
| 1.65 V to 1.95 V | $V_{CC}$ | $\leq 2$ ns   | 30 pF | 1 k $\Omega$ |
| 2.3 V to 2.7 V   | $V_{CC}$ | $\leq 2$ ns   | 30 pF | 500 $\Omega$ |
| 2.7 V            | 2.7 V    | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ |
| 3.0 V to 3.6 V   | 2.7 V    | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ |

## 12. Transfer characteristics

**Table 9. Transfer characteristics**

Voltages are referenced to GND (ground = 0 V); see Fig. 8.

| Symbol          | Parameter                                               | Conditions                  | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|-----------------|---------------------------------------------------------|-----------------------------|------------------|------|-------------------|------|------|
|                 |                                                         |                             | Min              | Max  | Min               | Max  |      |
| V <sub>T+</sub> | positive-going threshold voltage                        | V <sub>CC</sub> = 1.2 V     | 0.2              | 1.0  | 0.2               | 1.0  | V    |
|                 |                                                         | V <sub>CC</sub> = 1.65 V    | 0.4              | 1.3  | 0.4               | 1.3  | V    |
|                 |                                                         | V <sub>CC</sub> = 1.95 V    | 0.6              | 1.5  | 0.6               | 1.5  | V    |
|                 |                                                         | V <sub>CC</sub> = 2.3 V     | 0.8              | 1.7  | 0.8               | 1.7  | V    |
|                 |                                                         | V <sub>CC</sub> = 2.5 V     | 0.9              | 1.7  | 0.9               | 1.7  | V    |
|                 |                                                         | V <sub>CC</sub> = 2.7 V     | 1.1              | 2    | 1.1               | 2    | V    |
|                 |                                                         | V <sub>CC</sub> = 3 V       | 1.2              | 2    | 1.2               | 2    | V    |
|                 |                                                         | V <sub>CC</sub> = 3.6 V     | 1.2              | 2    | 1.2               | 2    | V    |
| V <sub>T-</sub> | negative-going threshold voltage                        | V <sub>CC</sub> = 1.2 V     | 0.12             | 0.75 | 0.12              | 0.75 | V    |
|                 |                                                         | V <sub>CC</sub> = 1.65 V    | 0.15             | 0.85 | 0.15              | 0.85 | V    |
|                 |                                                         | V <sub>CC</sub> = 1.95 V    | 0.25             | 0.95 | 0.25              | 0.95 | V    |
|                 |                                                         | V <sub>CC</sub> = 2.3 V     | 0.4              | 1.1  | 0.4               | 1.1  | V    |
|                 |                                                         | V <sub>CC</sub> = 2.5 V     | 0.4              | 1.2  | 0.4               | 1.2  | V    |
|                 |                                                         | V <sub>CC</sub> = 2.7 V     | 0.8              | 1.4  | 0.8               | 1.4  | V    |
|                 |                                                         | V <sub>CC</sub> = 3 V       | 0.8              | 1.5  | 0.8               | 1.5  | V    |
|                 |                                                         | V <sub>CC</sub> = 3.6 V     | 0.8              | 1.5  | 0.8               | 1.5  | V    |
| V <sub>H</sub>  | hysteresis voltage (V <sub>T+</sub> - V <sub>T-</sub> ) | V <sub>CC</sub> = 1.2 V     | 0.1              | 1.0  | 0.1               | 1.0  | V    |
|                 |                                                         | V <sub>CC</sub> = 1.65 V    | 0.2              | 1.15 | 0.2               | 1.15 | V    |
|                 |                                                         | V <sub>CC</sub> = 1.95 V    | 0.2              | 1.25 | 0.2               | 1.25 | V    |
|                 |                                                         | V <sub>CC</sub> = 2.3 V     | 0.3              | 1.3  | 0.3               | 1.3  | V    |
|                 |                                                         | V <sub>CC</sub> = 2.5 V     | 0.3              | 1.3  | 0.3               | 1.3  | V    |
|                 |                                                         | V <sub>CC</sub> = 2.7 V     | 0.3              | 1.1  | 0.3               | 1.1  | V    |
|                 |                                                         | V <sub>CC</sub> = 3 V       | 0.3              | 1.2  | 0.3               | 1.2  | V    |
|                 |                                                         | V <sub>CC</sub> = 3.6 V [1] | 0.3              | 1.2  | 0.3               | 1.2  | V    |

[1] Typical transfer characteristic is displayed in Fig. 9.

12.1. Waveforms transfer characteristics

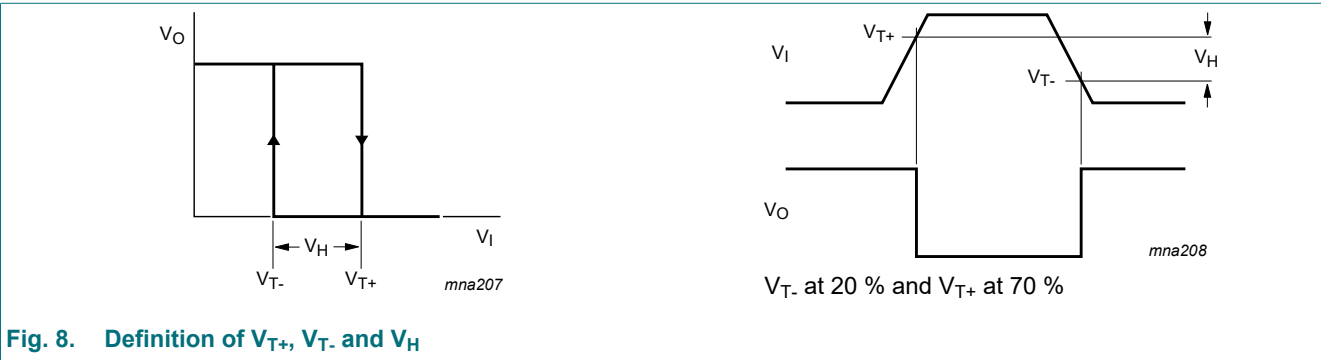


Fig. 8. Definition of  $V_{T+}$ ,  $V_{T-}$  and  $V_H$

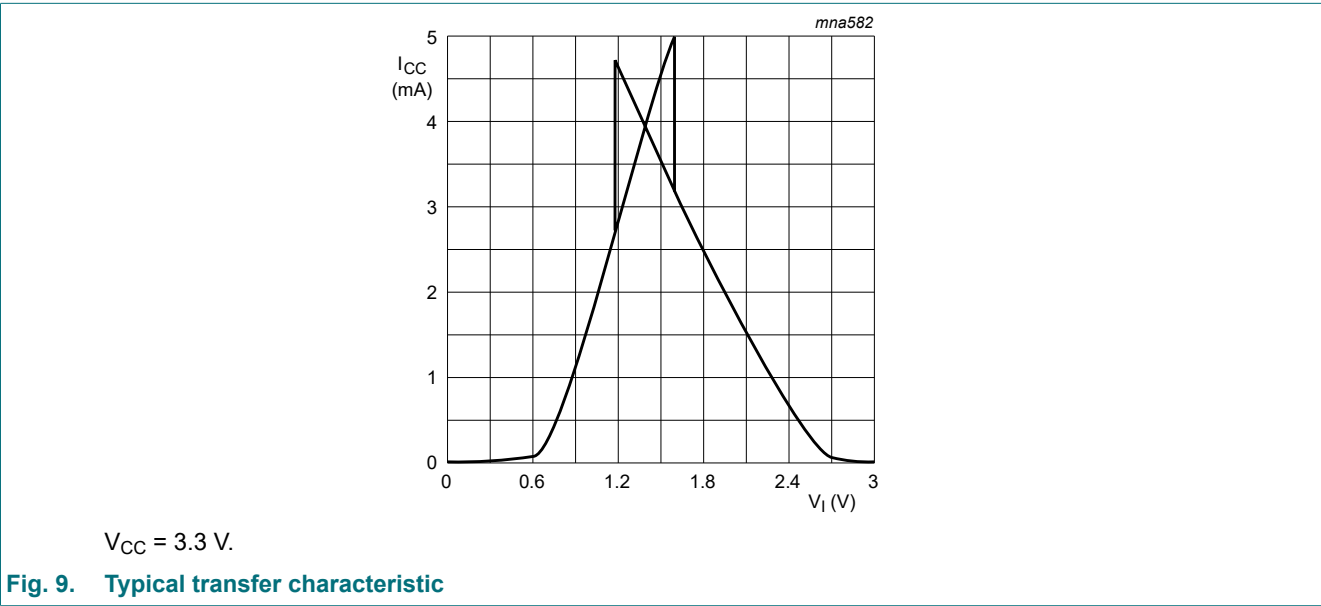


Fig. 9. Typical transfer characteristic

13. Package outline

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

SOT108-1

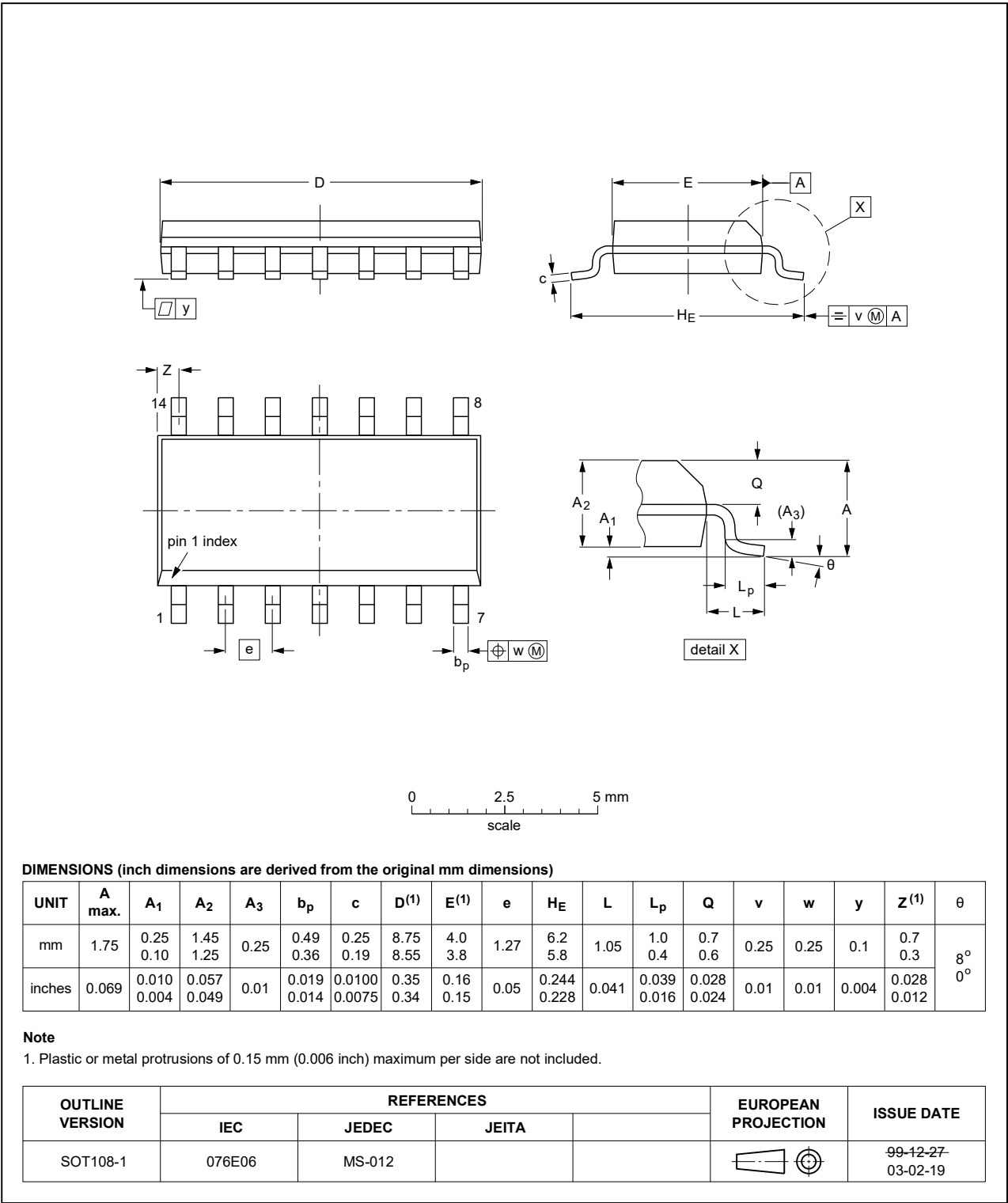


Fig. 10. Package outline SOT108-1 (SO14)

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

SOT402-1

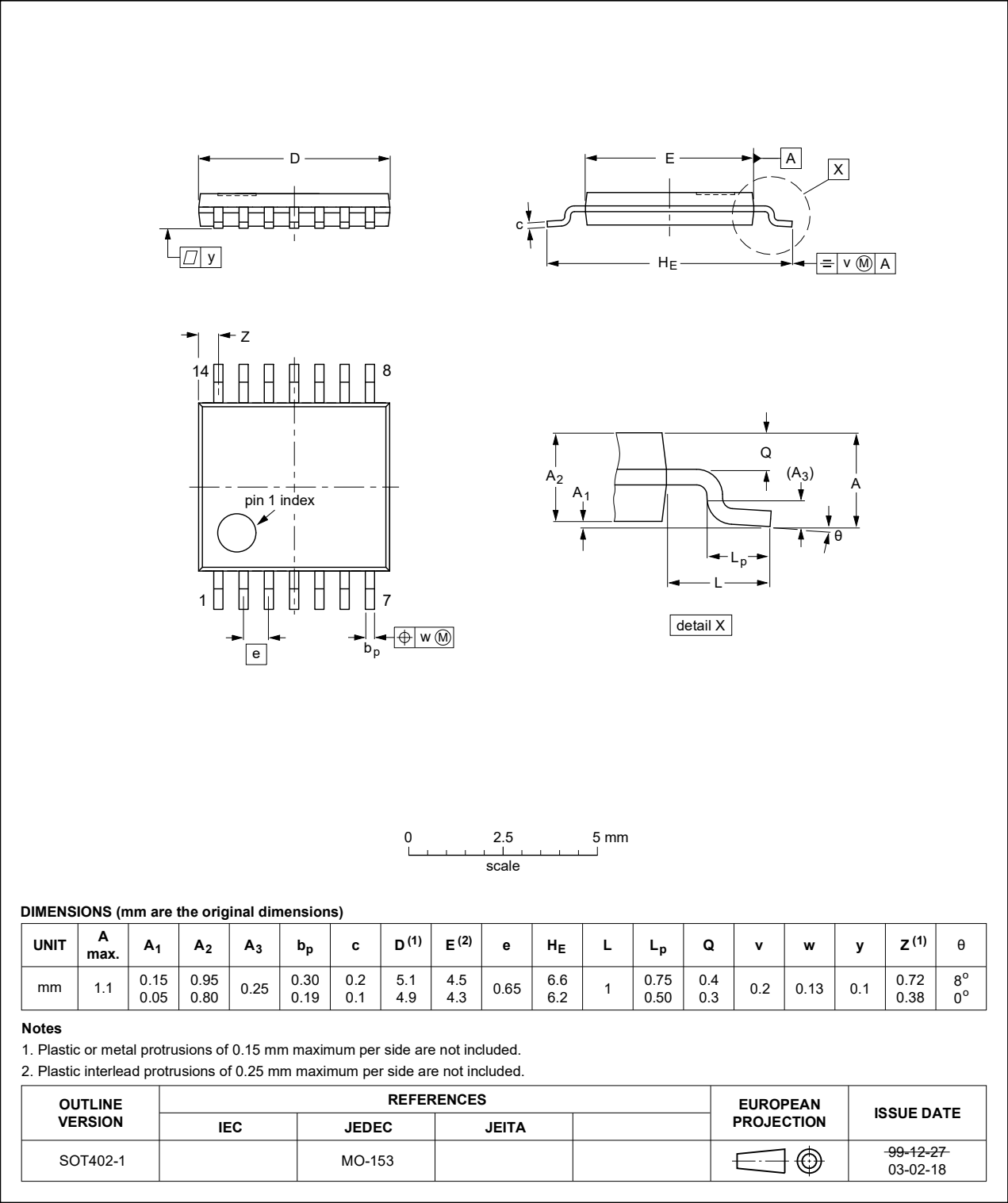


Fig. 11. Package outline SOT402-1 (TSSOP14)

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

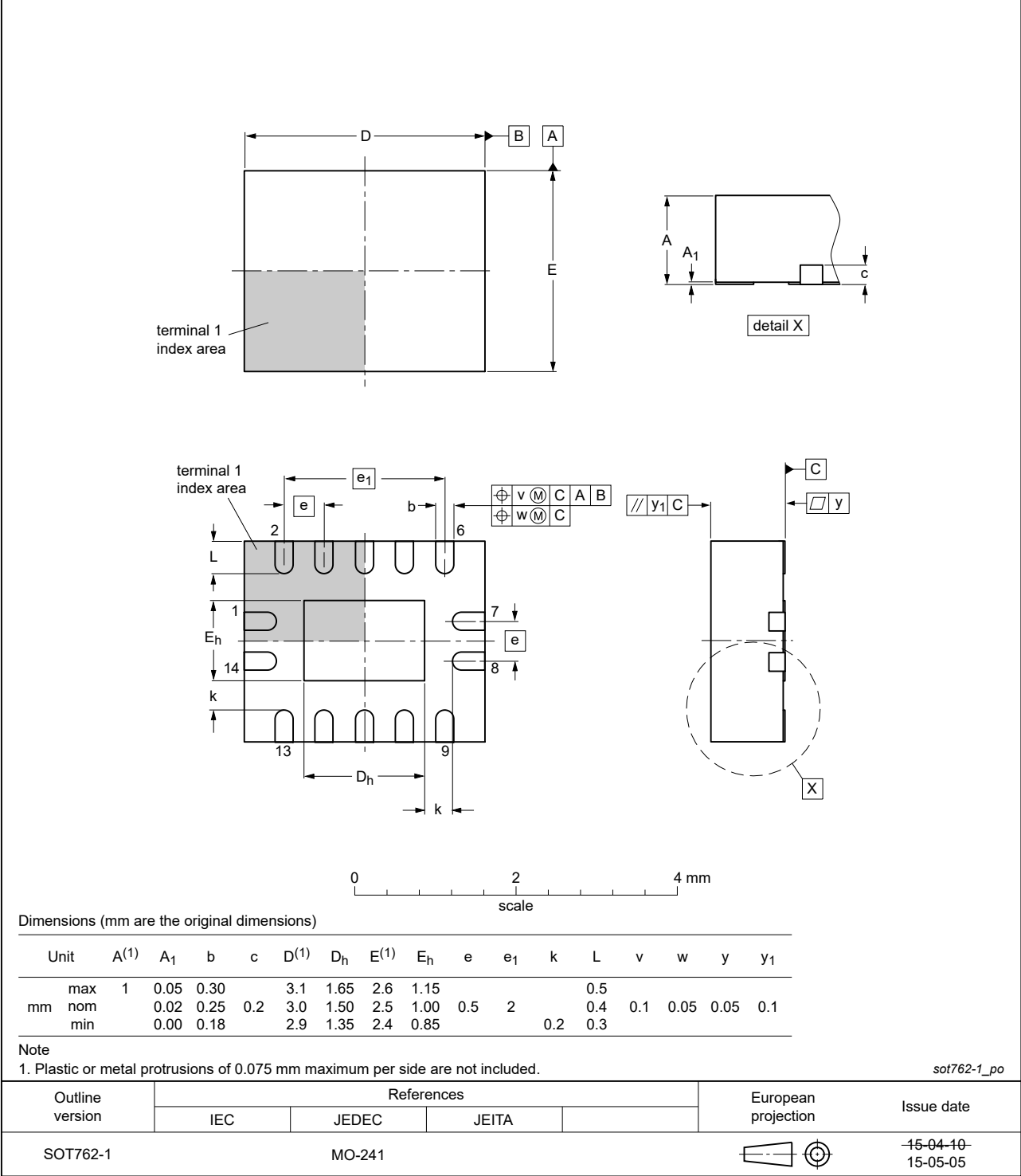


Fig. 12. Package outline SOT762-1 (DHVQFN14)

## 14. Abbreviations

Table 10. Abbreviations

| Acronym | Description                             |
|---------|-----------------------------------------|
| CDM     | Charged Device Model                    |
| CMOS    | Complementary Metal Oxide Semiconductor |
| DUT     | Device Under Test                       |
| ESD     | ElectroStatic Discharge                 |
| HBM     | Human Body Model                        |
| MM      | Machine Model                           |
| TTL     | Transistor-Transistor Logic             |

## 15. Revision history

Table 11. Revision history

| Document ID    | Release date                                                                                                                                                                                                                                                                                                                                                                                                                            | Data sheet status  | Change notice | Supersedes    |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|---------------|
| 74LVC132A v.4  | 20200706                                                                                                                                                                                                                                                                                                                                                                                                                                | Product data sheet | -             | 74LVC132A v.3 |
| 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="#">Table 4</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li><li><a href="#">Fig. 12</a>: Package outline drawing SOT762-1 (DHVQFN14) updated.</li></ul> |                    |               |               |
| 74LVC132A v.3  | 20111207                                                                                                                                                                                                                                                                                                                                                                                                                                | Product data sheet | -             | 74LVC132A v.2 |
| Modifications: | <ul style="list-style-type: none"><li>Legal pages updated.</li></ul>                                                                                                                                                                                                                                                                                                                                                                    |                    |               |               |
| 74LVC132A v.2  | 20110829                                                                                                                                                                                                                                                                                                                                                                                                                                | Product data sheet | -             | 74LVC132A v.1 |
| 74LVC132A v.1  | 20061215                                                                                                                                                                                                                                                                                                                                                                                                                                | Product data sheet | -             | -             |

## 16. Legal information

### Data sheet status

| Document status<br>[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.                                     |

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

|                                                 |           |
|-------------------------------------------------|-----------|
| <b>1. General description.....</b>              | <b>1</b>  |
| <b>2. Features and benefits.....</b>            | <b>1</b>  |
| <b>3. Applications.....</b>                     | <b>1</b>  |
| <b>4. Ordering information.....</b>             | <b>1</b>  |
| <b>5. Functional diagram.....</b>               | <b>2</b>  |
| <b>6. Pinning information.....</b>              | <b>2</b>  |
| 6.1. Pinning.....                               | 2         |
| 6.2. Pin description.....                       | 2         |
| <b>7. Functional description.....</b>           | <b>3</b>  |
| <b>8. Limiting values.....</b>                  | <b>3</b>  |
| <b>9. Recommended operating conditions.....</b> | <b>3</b>  |
| <b>10. Static characteristics.....</b>          | <b>4</b>  |
| <b>11. Dynamic characteristics.....</b>         | <b>5</b>  |
| 11.1. Waveforms and test circuit.....           | 5         |
| <b>12. Transfer characteristics.....</b>        | <b>7</b>  |
| 12.1. Waveforms transfer characteristics.....   | 8         |
| <b>13. Package outline.....</b>                 | <b>9</b>  |
| <b>14. Abbreviations.....</b>                   | <b>12</b> |
| <b>15. Revision history.....</b>                | <b>12</b> |
| <b>16. Legal information.....</b>               | <b>13</b> |

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For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9