

# 74LVT2952

## 3.3 V Octal registered transceiver; 3-State

Rev. 4 — 11 September 2013

Product data sheet

### 1. General description

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The 74LVT2952 is a high-performance BiCMOS product designed for  $V_{CC}$  operation at 3.3 V.

This device combines low static and dynamic power dissipation with high speed and high output drive.

The 74LVT2952 device is an 8-bit registered transceiver. Two 8-bit back-to-back registers store data flowing in both directions between two bidirectional buses.

Data applied to the inputs is entered and stored on the rising edge of the clock (CPxx) if the clock enable (CExx) is LOW. The data is then present at the 3-state output buffers, but is only accessible when the output enable ( $\overline{OE}$ xx) is LOW. Data flow from An inputs to Bn outputs is the same as for Bn inputs to An outputs.

### 2. Features and benefits

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- 8-bit registered transceiver
- Independent registers for A and B buses
- Input and output interface capability to systems at 5 V supply
- TTL input and output switching levels
- Output capability: +64 mA/–32 mA
- Latch-up protection exceeds 500 mA per JESD78 class II level A
- ESD protection:
  - ◆ HBM JESD22-A114E exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
- Bus-hold data inputs eliminate the need for external pull-up resistors for unused inputs
- Live insertion/extraction permitted
- Power-up reset
- Power-up 3-state
- No bus current loading when output is tied to 5 V bus



3. Ordering information

| Type number | Package           |         |                                                                           |          |
|-------------|-------------------|---------|---------------------------------------------------------------------------|----------|
|             | Temperature range | Name    | Description                                                               | Version  |
| 74LVT2952D  | −40 °C to +85 °C  | SO24    | plastic small outline package; 24 leads;<br>body width 7.5 mm             | SOT137-1 |
| 74LVT2952DB | −40 °C to +85 °C  | SSOP24  | plastic shrink small outline package; 24 leads;<br>body width 5.3 mm      | SOT340-1 |
| 74LVT2952PW | −40 °C to +85 °C  | TSSOP24 | plastic thin shrink small outline package; 24 leads;<br>body width 4.4 mm | SOT355-1 |

4. Functional diagram

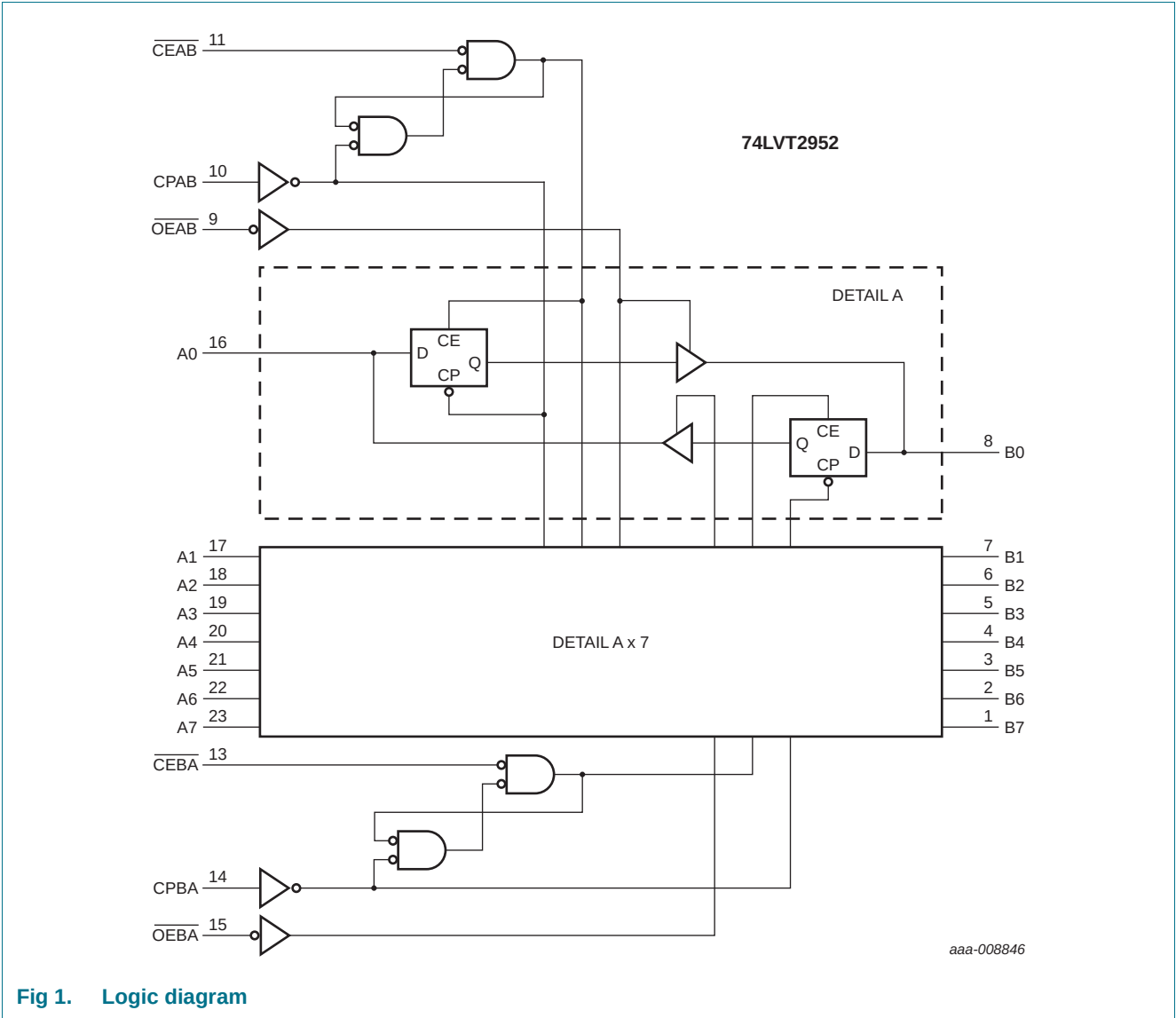
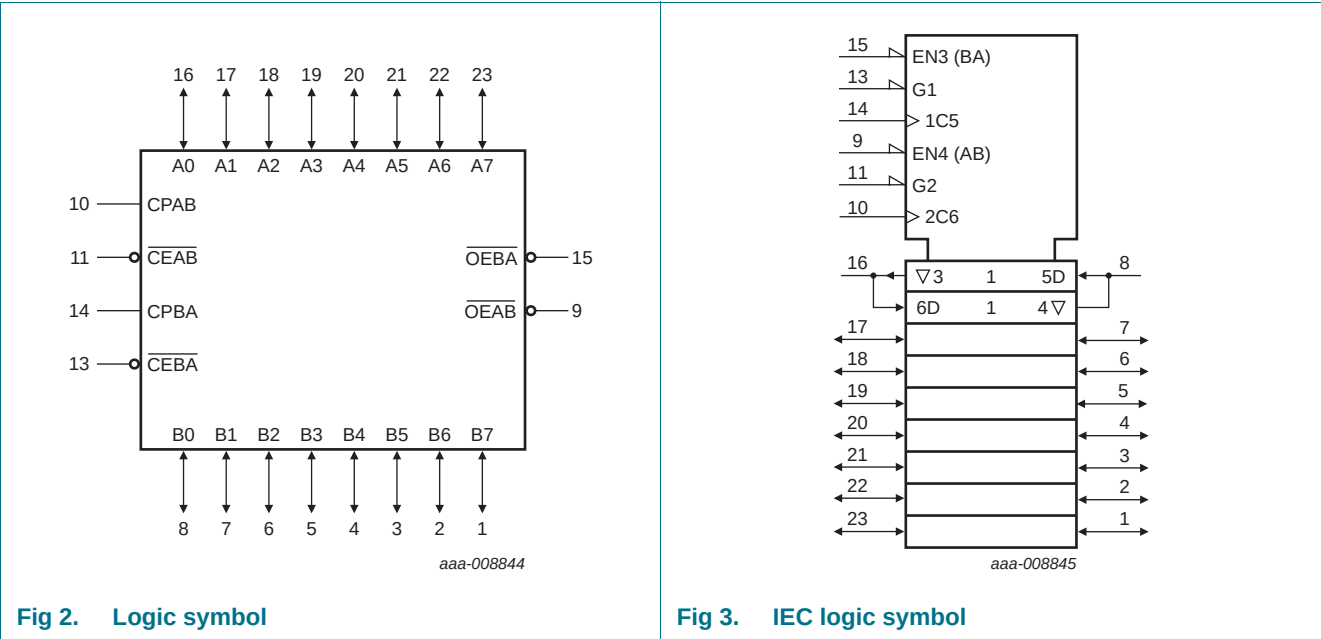
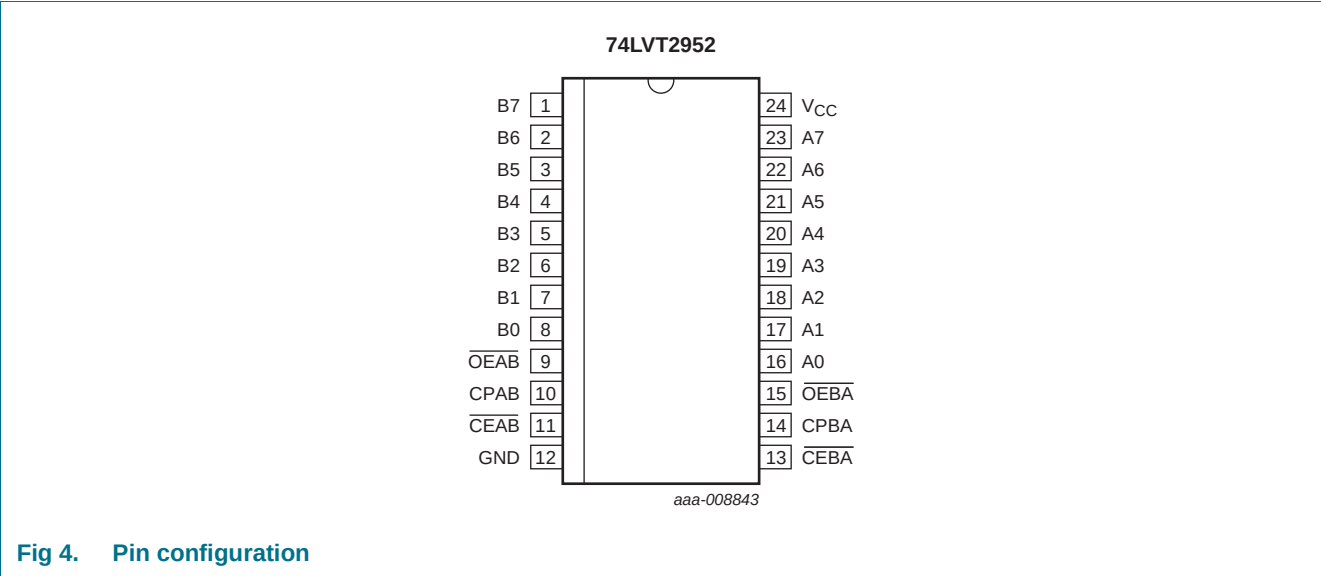


Fig 1. Logic diagram



5. Pinning information

5.1 Pinning



## 5.2 Pin description

**Table 2.** Pin description

| Symbol                                              | Pin                            | Description                      |
|-----------------------------------------------------|--------------------------------|----------------------------------|
| B7 to B0                                            | 1, 2, 3, 4, 5, 6, 7, 8         | data input/output (B side)       |
| $\overline{\text{OEAB}}$ , $\overline{\text{OEBA}}$ | 9, 15                          | output enable input (active LOW) |
| CPAB, CPBA                                          | 10, 14                         | clock input                      |
| $\overline{\text{CEAB}}$ , $\overline{\text{CEBA}}$ | 11, 13                         | clock enable input               |
| GND                                                 | 12                             | ground (0 V)                     |
| A0 to A7                                            | 16, 17, 18, 19, 20, 21, 22, 23 | data input/output (A side)       |
| V <sub>CC</sub>                                     | 24                             | supply voltage                   |

## 6. Functional description

**Table 3.** Function selection<sup>[1]</sup>

| Inputs |                     |                                         | Internal | Operating mode |
|--------|---------------------|-----------------------------------------|----------|----------------|
| An, Bn | CPxx <sup>[2]</sup> | $\overline{\text{CExx}}$ <sup>[2]</sup> |          |                |
| X      | X                   | H                                       | nc       | hold data      |
| L      | ↑                   | L                                       | L        | load data      |
| H      | ↑                   | L                                       | H        | load data      |

- [1] H = HIGH voltage level;  
 L = LOW voltage level;  
 X = don't care;  
 ↑ = LOW-to-HIGH clock transition;  
 nc = no change.

- [2] xx = AB or BA.

**Table 4.** Function selection<sup>[1]</sup>

| Inputs                                  | Internal Q | An, Bn outputs | Operating mode   |
|-----------------------------------------|------------|----------------|------------------|
| $\overline{\text{OExx}}$ <sup>[2]</sup> |            |                |                  |
| H                                       | X          | Z              | outputs disabled |
| L                                       | L          | L              | outputs enabled  |
| L                                       | H          | H              | outputs enabled  |

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

- [2] xx = AB or BA.

## 7. Limiting values

**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).<sup>[1][2]</sup>

| Symbol           | Parameter               | Conditions                          | Min                 | Max  | Unit |
|------------------|-------------------------|-------------------------------------|---------------------|------|------|
| V <sub>CC</sub>  | supply voltage          |                                     | -0.5                | +4.6 | V    |
| V <sub>I</sub>   | input voltage           |                                     | <sup>[3]</sup> -0.5 | 7.0  | V    |
| V <sub>O</sub>   | output voltage          | output in OFF or HIGH state         | <sup>[3]</sup> -0.5 | +7   | V    |
| I <sub>IK</sub>  | input clamping current  | V <sub>I</sub> < 0 V                | -50                 | -    | mA   |
| I <sub>OK</sub>  | output clamping current | V <sub>O</sub> < 0 V                | -50                 | -    | mA   |
| I <sub>O</sub>   | output current          | output in LOW state                 | -                   | 128  | mA   |
|                  |                         | output in HIGH state                | -64                 | -    | mA   |
| T <sub>stg</sub> | storage temperature     |                                     | -65                 | +150 | °C   |
| T <sub>j</sub>   | junction temperature    |                                     | -                   | +150 | °C   |
| P <sub>tot</sub> | total power dissipation | T <sub>amb</sub> = -40 °C to +85 °C | <sup>[4]</sup> -    | 500  | mW   |

- [1] Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- [2] The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150 °C.
- [3] The input and output negative voltage ratings may be exceeded if the input and output clamp current ratings are observed.
- [4] For SO20 packages: above 70 °C derate linearly with 8 mW/K.  
For SSOP20 and TSSOP20 packages: above 60 °C derate linearly with 5.5 mW/K.

## 8. Recommended operating conditions

**Table 6. Recommended operating conditions**

| Symbol           | Parameter                           | Conditions                                        | Min | Max | Unit |
|------------------|-------------------------------------|---------------------------------------------------|-----|-----|------|
| V <sub>CC</sub>  | supply voltage                      |                                                   | 2.7 | 3.6 | V    |
| V <sub>I</sub>   | input voltage                       |                                                   | 0   | 5.5 | V    |
| I <sub>OH</sub>  | HIGH-level output current           |                                                   | -   | -32 | mA   |
| I <sub>OL</sub>  | LOW-level output current            |                                                   | -   | 32  | mA   |
|                  |                                     | current duty cycle ≤ 50 %; f <sub>i</sub> ≥ 1 kHz | -   | 64  | mA   |
| T <sub>amb</sub> | ambient temperature                 | in free air                                       | -40 | +85 | °C   |
| Δt/ΔV            | input transition rise and fall rate | output enabled                                    | -   | 10  | ns/V |

## 9. Static characteristics

**Table 7. Static characteristics**

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

| Symbol              | Parameter                         | Conditions                                                                                                                                                 | T <sub>amb</sub> = –40 °C to +85 °C |                       |      | Unit |
|---------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------|------|------|
|                     |                                   |                                                                                                                                                            | Min                                 | Typ <sup>[1]</sup>    | Max  |      |
| V <sub>IK</sub>     | input clamping voltage            | V <sub>CC</sub> = 2.7 V; I <sub>IK</sub> = –18 mA                                                                                                          | –1.2                                | –0.9                  | –    | V    |
| V <sub>IH</sub>     | HIGH-level input voltage          |                                                                                                                                                            | 2.0                                 | –                     | –    | V    |
| V <sub>IL</sub>     | LOW-level input voltage           |                                                                                                                                                            | –                                   | –                     | 0.8  |      |
| V <sub>OH</sub>     | HIGH-level output voltage         | V <sub>CC</sub> = 2.7 V to 3.6 V; I <sub>OH</sub> = –100 µA                                                                                                | V <sub>CC</sub> – 0.2               | V <sub>CC</sub> – 0.1 | –    | V    |
|                     |                                   | V <sub>CC</sub> = 2.7 V; I <sub>OH</sub> = –8 mA                                                                                                           | 2.4                                 | 2.5                   | –    |      |
|                     |                                   | V <sub>CC</sub> = 3.0 V; I <sub>OH</sub> = –32 mA                                                                                                          | 2.0                                 | 2.2                   | –    | V    |
| V <sub>OL</sub>     | LOW-level output voltage          | V <sub>CC</sub> = 2.7 V; I <sub>OL</sub> = 100 µA                                                                                                          | –                                   | 0.1                   | 0.2  | V    |
|                     |                                   | V <sub>CC</sub> = 2.7 V; I <sub>OL</sub> = 24 mA                                                                                                           | –                                   | 0.3                   | 0.5  | V    |
|                     |                                   | V <sub>CC</sub> = 3.0 V; I <sub>OL</sub> = 16 mA                                                                                                           | –                                   | 0.25                  | 0.4  | V    |
|                     |                                   | V <sub>CC</sub> = 3.0 V; I <sub>OL</sub> = 32 mA                                                                                                           | –                                   | 0.3                   | 0.5  | V    |
|                     |                                   | V <sub>CC</sub> = 3.0 V; I <sub>OL</sub> = 64 mA                                                                                                           | –                                   | 0.4                   | 0.55 | V    |
| V <sub>OL(pu)</sub> | power-up LOW-level output voltage | V <sub>CC</sub> = 3.6 V; I <sub>O</sub> = 1 mA; V <sub>I</sub> = GND or V <sub>CC</sub> <sup>[2]</sup>                                                     | –                                   | 0.13                  | 0.55 | V    |
| I <sub>I</sub>      | input leakage current             | control pins                                                                                                                                               |                                     |                       |      |      |
|                     |                                   | V <sub>CC</sub> = 0 V or 3.6 V; V <sub>I</sub> = 5.5 V                                                                                                     | –                                   | 1                     | 10   | µA   |
|                     |                                   | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> or GND                                                                                           | –                                   | ±0.1                  | ±1   | µA   |
|                     |                                   | I/O data pins <sup>[3]</sup>                                                                                                                               |                                     |                       |      |      |
|                     |                                   | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = 5.5 V                                                                                                            | –                                   | 1                     | 20   | µA   |
|                     |                                   | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub>                                                                                                  | –                                   | 0.1                   | 1    | µA   |
| I <sub>OFF</sub>    | power-off leakage current         | V <sub>CC</sub> = 0 V; V <sub>I</sub> or V <sub>O</sub> = 0 V to 4.5 V                                                                                     | –                                   | 1                     | ±100 | µA   |
|                     |                                   | V <sub>O</sub> = 5.5 V; V <sub>CC</sub> = 3.6 V; output HIGH                                                                                               | –                                   | 60                    | 125  | µA   |
|                     |                                   | V <sub>CC</sub> ≤ 1.2 V V <sub>O</sub> = 0.5 V to V <sub>CC</sub> ; V <sub>I</sub> = GND or V <sub>CC</sub> ; OE <sub>xx</sub> = don't care <sup>[4]</sup> | –                                   | 1                     | ±100 | µA   |
| I <sub>BHL</sub>    | bus hold LOW current              | V <sub>CC</sub> = 3.0 V; V <sub>I</sub> = 0.8 V                                                                                                            | 75                                  | 150                   | –    | µA   |
| I <sub>BHH</sub>    | bus hold HIGH current             | V <sub>CC</sub> = 3.0 V; V <sub>I</sub> = 2.0 V                                                                                                            | –                                   | –150                  | –75  | µA   |
| I <sub>BHLO</sub>   | bus hold LOW overdrive current    | V <sub>CC</sub> = 0 V to 3.0 V; V <sub>I</sub> = 3.6 V <sup>[5]</sup>                                                                                      | 500                                 | –                     | –    | µA   |
| I <sub>BHHO</sub>   | bus hold HIGH overdrive current   | V <sub>CC</sub> = 0 V to 3.0 V; V <sub>I</sub> = 3.6 V <sup>[5]</sup>                                                                                      | –                                   | –                     | –500 | 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                                                                     |                                     |                       |      |      |
|                     |                                   | outputs HIGH                                                                                                                                               | –                                   | 0.13                  | 0.19 | mA   |
|                     |                                   | outputs LOW                                                                                                                                                | –                                   | 3                     | 12   | mA   |
|                     |                                   | outputs disabled                                                                                                                                           | –                                   | 0.13                  | 0.19 | mA   |
| ΔI <sub>CC</sub>    | additional supply current         | per input pin; V <sub>CC</sub> = 3.0 V to 3.6 V; one input = V <sub>CC</sub> – 0.6 V; other inputs at V <sub>CC</sub> or GND <sup>[6]</sup>                | –                                   | 0.1                   | 0.2  | mA   |
| C <sub>I</sub>      | input capacitance                 | control inputs; outputs disabled; V <sub>I</sub> = 0 V or 3.0 V                                                                                            | –                                   | 4                     | –    | pF   |

**Table 7.** Static characteristics ...continued

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

| Symbol           | Parameter                | Conditions                                                             | T <sub>amb</sub> = -40 °C to +85 °C |                    |     | Unit |
|------------------|--------------------------|------------------------------------------------------------------------|-------------------------------------|--------------------|-----|------|
|                  |                          |                                                                        | Min                                 | Typ <sup>[1]</sup> | Max |      |
| C <sub>I/O</sub> | input/output capacitance | at I/O data pins, outputs disabled;<br>V <sub>I/O</sub> = 0 V or 3.0 V | -                                   | 8                  | -   | pF   |

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

[2] For valid test results, data must not be loaded into the flip-flops (or latches) after applying power.

[3] Unused pins at V<sub>CC</sub> or GND.[4] This parameter is valid for any V<sub>CC</sub> between 0 V and 1.2 V with a transition time of up to 10 ms. From V<sub>CC</sub> = 1.2 V to V<sub>CC</sub> = 3.3 V ± 0.3 V a transition time of 100 ms is permitted. This parameter is valid for T<sub>amb</sub> = +25 °C only.

[5] This parameter is the bus hold overdrive current required to force the input to the opposite logic state.

[6] This parameter is the increase in supply current for each input at the specified voltage level other than V<sub>CC</sub> or GND.

## 10. Dynamic characteristics

**Table 8.** Dynamic characteristicsVoltages are referenced to GND (ground = 0 V). For test circuit, see [Figure 8](#).

| Symbol             | Parameter                           | Conditions                                                 | T <sub>amb</sub> = -40 °C to +85 °C |                    |     | Unit |
|--------------------|-------------------------------------|------------------------------------------------------------|-------------------------------------|--------------------|-----|------|
|                    |                                     |                                                            | Min                                 | Typ <sup>[1]</sup> | Max |      |
| t <sub>PLH</sub>   | LOW to HIGH propagation delay       | CPBA to An or CPAB to Bn; see <a href="#">Figure 5</a>     |                                     |                    |     |      |
|                    |                                     | V <sub>CC</sub> = 2.7 V                                    | -                                   | -                  | 7.1 | ns   |
|                    |                                     | V <sub>CC</sub> = 3.3 V ± 0.3 V                            | 1.3                                 | 3.1                | 6.1 | ns   |
| t <sub>PHL</sub>   | HIGH to LOW propagation delay       | CPBA to An or CPAB to Bn; see <a href="#">Figure 5</a>     |                                     |                    |     |      |
|                    |                                     | V <sub>CC</sub> = 2.7 V                                    | -                                   | -                  | 6.9 | ns   |
|                    |                                     | V <sub>CC</sub> = 3.3 V ± 0.3 V                            | 1.8                                 | 3.8                | 6.0 | ns   |
| t <sub>PZH</sub>   | OFF-state to HIGH propagation delay | OEBA to An; OEAB to Bn; see <a href="#">Figure 7</a>       |                                     |                    |     |      |
|                    |                                     | V <sub>CC</sub> = 2.7 V                                    | -                                   | -                  | 6.7 | ns   |
|                    |                                     | V <sub>CC</sub> = 3.3 V ± 0.3 V                            | 1.0                                 | 3.4                | 5.6 | ns   |
| t <sub>PZL</sub>   | OFF-state to LOW propagation delay  | OEBA to An; OEAB to Bn; see <a href="#">Figure 7</a>       |                                     |                    |     |      |
|                    |                                     | V <sub>CC</sub> = 2.7 V                                    | -                                   | -                  | 8.0 | ns   |
|                    |                                     | V <sub>CC</sub> = 3.3 V ± 0.3 V                            | 1.2                                 | 3.6                | 6.5 | ns   |
| t <sub>PHZ</sub>   | HIGH to OFF-state propagation delay | OEBA to An; OEAB to Bn; see <a href="#">Figure 7</a>       |                                     |                    |     |      |
|                    |                                     | V <sub>CC</sub> = 2.7 V                                    | -                                   | -                  | 6.9 | ns   |
|                    |                                     | V <sub>CC</sub> = 3.3 V ± 0.3 V                            | 1.0                                 | 3.7                | 6.3 | ns   |
| t <sub>PLZ</sub>   | LOW to OFF-state propagation delay  | OEBA to An; OEAB to Bn; see <a href="#">Figure 7</a>       |                                     |                    |     |      |
|                    |                                     | V <sub>CC</sub> = 2.7 V                                    | -                                   | -                  | 5.3 | ns   |
|                    |                                     | V <sub>CC</sub> = 3.3 V ± 0.3 V                            | 1.6                                 | 3.4                | 5.1 | ns   |
| t <sub>su(H)</sub> | set-up time HIGH                    | An to CPAB or Bn to CPBA; see <a href="#">Figure 7</a>     |                                     |                    |     |      |
|                    |                                     | V <sub>CC</sub> = 2.7 V                                    | 2.8                                 | -                  | -   | ns   |
|                    |                                     | V <sub>CC</sub> = 3.3 V ± 0.3 V                            | 2.5                                 | 1.0                | -   | ns   |
|                    |                                     | CEAB to CPAB or CEBA to CPBA; see <a href="#">Figure 7</a> |                                     |                    |     |      |
|                    |                                     | V <sub>CC</sub> = 2.7 V                                    | 0.8                                 | -                  | -   | ns   |
|                    |                                     | V <sub>CC</sub> = 3.3 V ± 0.3 V                            | 0.9                                 | 0.3                | -   | ns   |

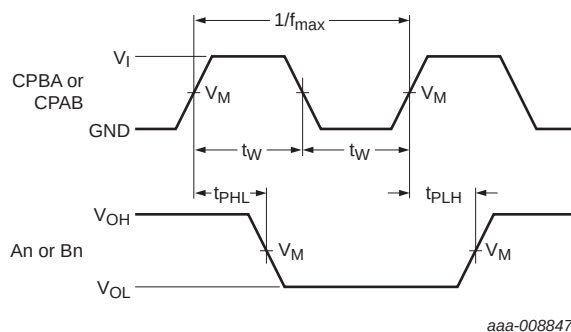
**Table 8.** Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V). For test circuit, see [Figure 8](#).

| Symbol             | Parameter         | Conditions                                                                                         | T <sub>amb</sub> = -40 °C to +85 °C |                    |     | Unit |
|--------------------|-------------------|----------------------------------------------------------------------------------------------------|-------------------------------------|--------------------|-----|------|
|                    |                   |                                                                                                    | Min                                 | Typ <sup>[1]</sup> | Max |      |
| t <sub>su(L)</sub> | set-up time LOW   | An to CPAB or Bn to CPBA; see <a href="#">Figure 7</a>                                             |                                     |                    |     |      |
|                    |                   | V <sub>CC</sub> = 2.7 V                                                                            | 3.0                                 | -                  | -   | ns   |
|                    |                   | V <sub>CC</sub> = 3.3 V ± 0.3 V                                                                    | 2.5                                 | 1.0                | -   | ns   |
|                    |                   | $\overline{\text{CEAB}}$ to CPAB or $\overline{\text{CEBA}}$ to CPBA; see <a href="#">Figure 7</a> |                                     |                    |     |      |
|                    |                   | V <sub>CC</sub> = 2.7 V                                                                            | 2.7                                 | -                  | -   | ns   |
| t <sub>h(H)</sub>  | hold time HIGH    | An to CPAB or Bn to CPBA; see <a href="#">Figure 7</a>                                             |                                     |                    |     |      |
|                    |                   | V <sub>CC</sub> = 2.7 V                                                                            | 0.7                                 | -                  | -   | ns   |
|                    |                   | V <sub>CC</sub> = 3.3 V ± 0.3 V                                                                    | 1.5                                 | -0.5               | -   | ns   |
|                    |                   | $\overline{\text{CEAB}}$ to CPAB or $\overline{\text{CEBA}}$ to CPBA; see <a href="#">Figure 7</a> |                                     |                    |     |      |
|                    |                   | V <sub>CC</sub> = 2.7 V                                                                            | 0.7                                 | -                  | -   | ns   |
| t <sub>h(L)</sub>  | hold time LOW     | An to CPAB or Bn to CPBA; see <a href="#">Figure 7</a>                                             |                                     |                    |     |      |
|                    |                   | V <sub>CC</sub> = 2.7 V                                                                            | 2.6                                 | -                  | -   | ns   |
|                    |                   | V <sub>CC</sub> = 3.3 V ± 0.3 V                                                                    | 1.5                                 | -0.5               | -   | ns   |
|                    |                   | $\overline{\text{CEAB}}$ to CPAB or $\overline{\text{CEBA}}$ to CPBA; see <a href="#">Figure 7</a> |                                     |                    |     |      |
|                    |                   | V <sub>CC</sub> = 2.7 V                                                                            | 2.6                                 | -                  | -   | ns   |
| t <sub>w</sub>     | pulse width       | CPAB or CPBA; HIGH or LOW; see <a href="#">Figure 5</a>                                            |                                     |                    |     |      |
|                    |                   | V <sub>CC</sub> = 2.7 V                                                                            | 3.3                                 | -                  | -   | ns   |
|                    |                   | V <sub>CC</sub> = 3.3 V ± 0.3 V                                                                    | 3.3                                 | 1.0                | -   | ns   |
| f <sub>max</sub>   | maximum frequency | CPBA, CPAB; V <sub>CC</sub> = 3.3 V ± 0.3 V; see <a href="#">Figure 5</a>                          | 150                                 | 200                | -   | MHz  |

[1] Typical values are measured at T<sub>amb</sub> = 25 °C and V<sub>CC</sub> = 3.3 V.

## 11. Waveforms



See [Table 9](#) for measurement points

**Fig 5.** Clock input to output propagation delay, clock pulse width and maximum frequency



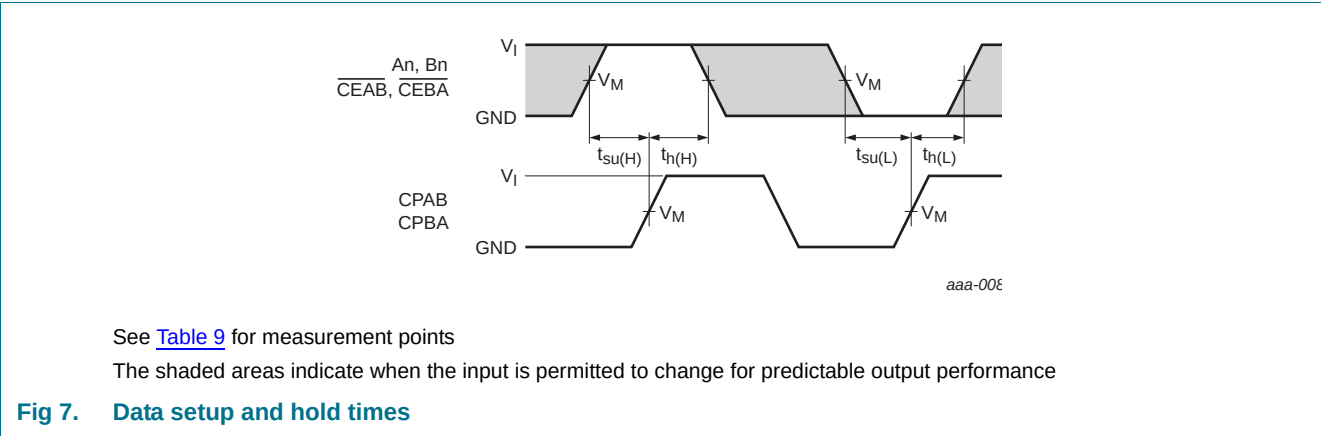
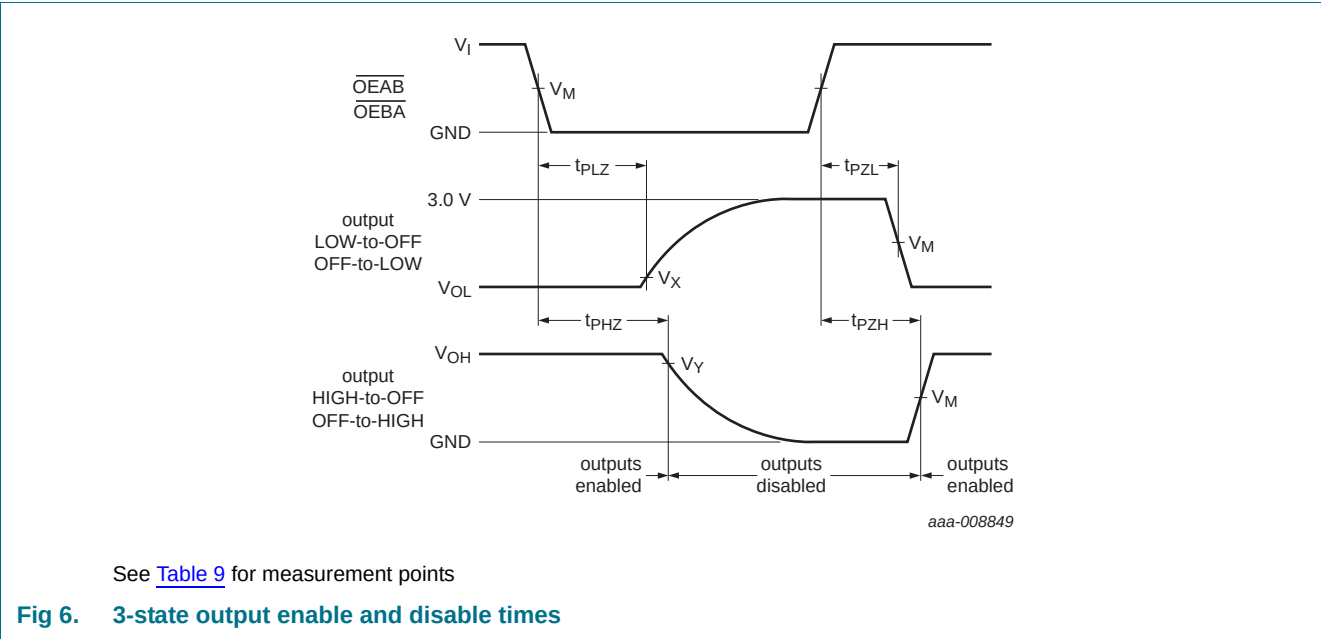
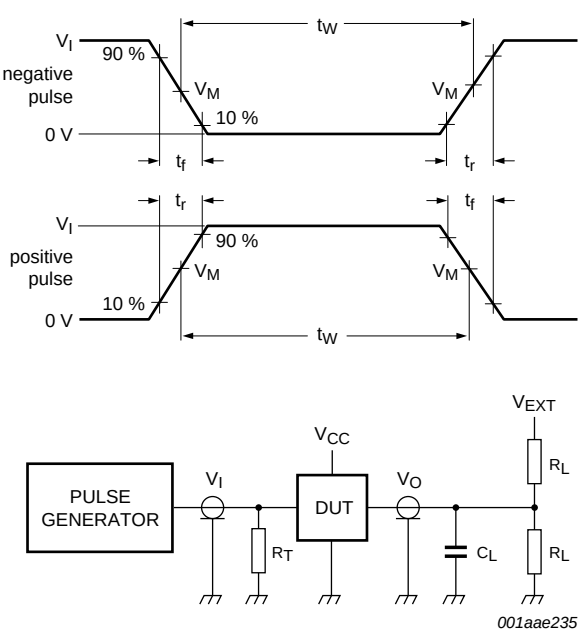


Table 9. Measurement points

| V <sub>CC</sub> | Input          |                | Output         |                         |                         |
|-----------------|----------------|----------------|----------------|-------------------------|-------------------------|
|                 | V <sub>I</sub> | V <sub>M</sub> | V <sub>M</sub> | V <sub>X</sub>          | V <sub>Y</sub>          |
| 2.7 V to 3.6 V  | GND to 2.7 V   | 1.5 V          | 1.5 V          | V <sub>OL</sub> + 0.3 V | V <sub>OH</sub> - 0.3 V |



Test data is given in [Table 10](#).

Definitions 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.

$V_{EXT}$  = External voltage for measuring switching times.

Fig 8. Test circuit for switching times

Table 10. Test data

| Input |               |        |               | Load         |       | $V_{EXT}$          |                    |                    |
|-------|---------------|--------|---------------|--------------|-------|--------------------|--------------------|--------------------|
| $V_I$ | $f_i$         | $t_W$  | $t_r, t_f$    | $R_L$        | $C_L$ | $t_{PHZ}, t_{PZH}$ | $t_{PLZ}, t_{PZL}$ | $t_{PLH}, t_{PHL}$ |
| 2.7 V | $\leq 10$ MHz | 500 ns | $\leq 2.5$ ns | 500 $\Omega$ | 50 pF | GND                | 6 V                | open               |

12. Package outline

SO24: plastic small outline package; 24 leads; body width 7.5 mm

SOT137-1

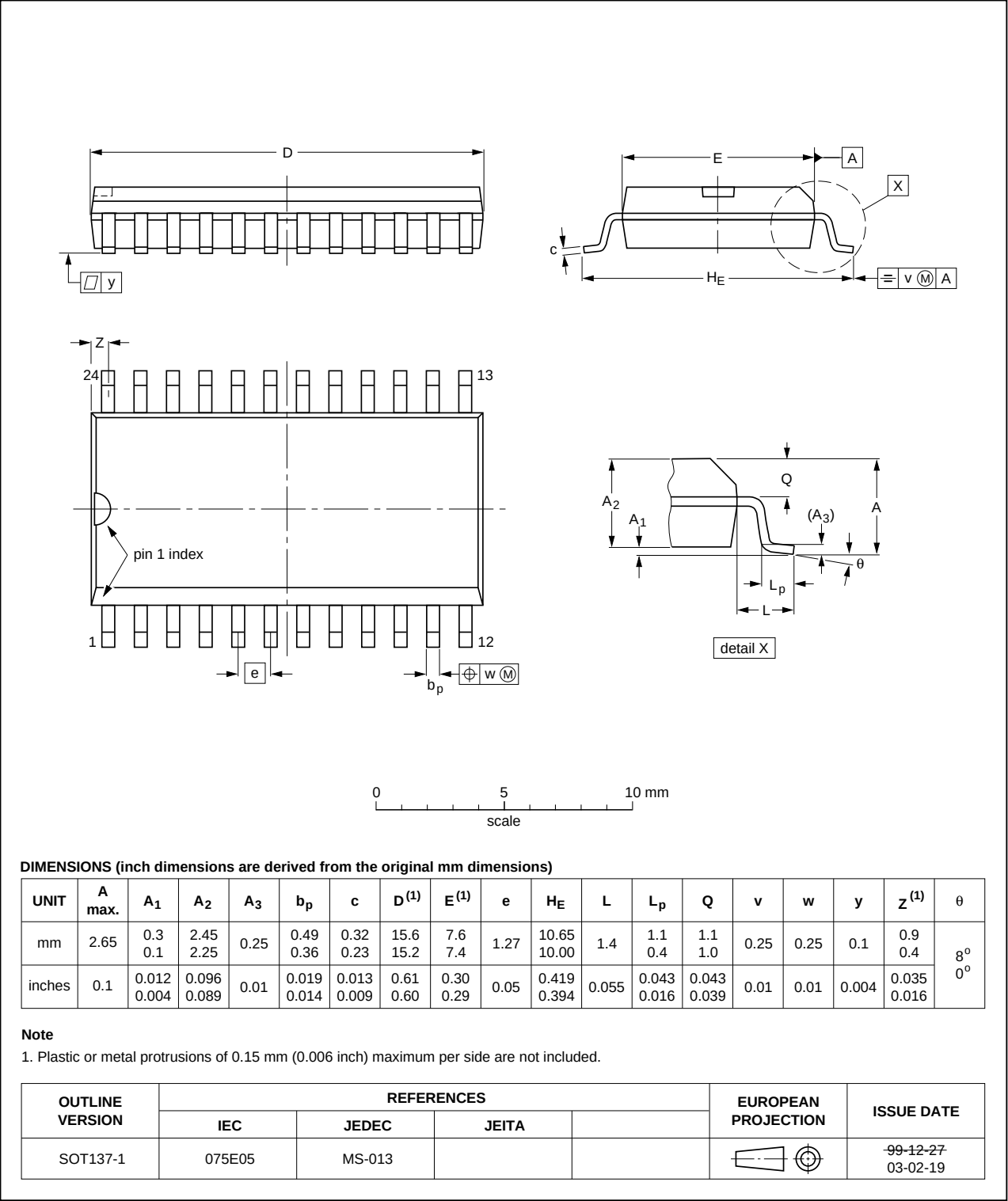


Fig 9. Package outline SOT137-1 (SO24)

SSOP24: plastic shrink small outline package; 24 leads; body width 5.3 mm

SOT340-1

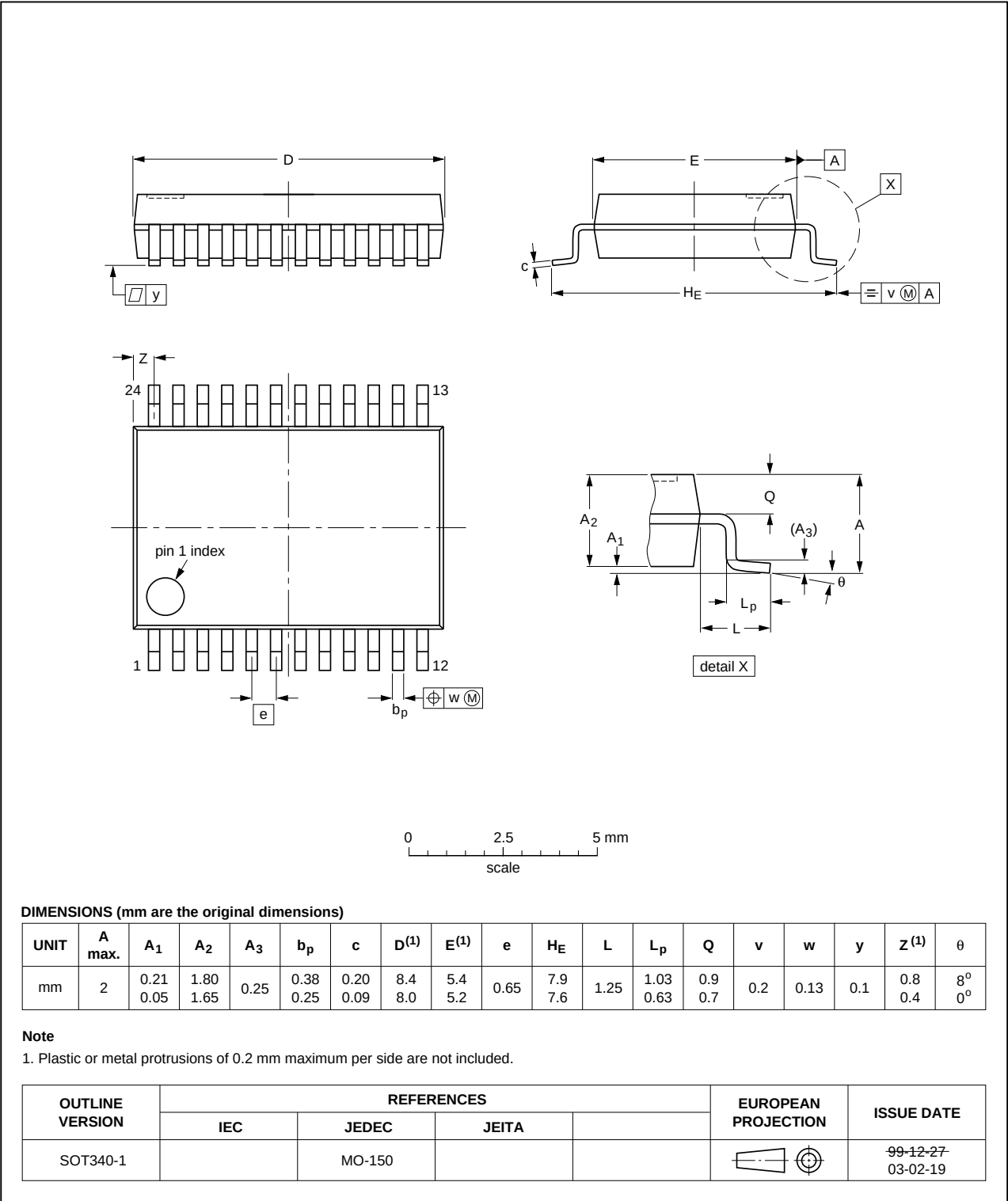


Fig 10. Package outline SOT340-1 (SSOP24)

TSSOP24: plastic thin shrink small outline package; 24 leads; body width 4.4 mm

SOT355-1

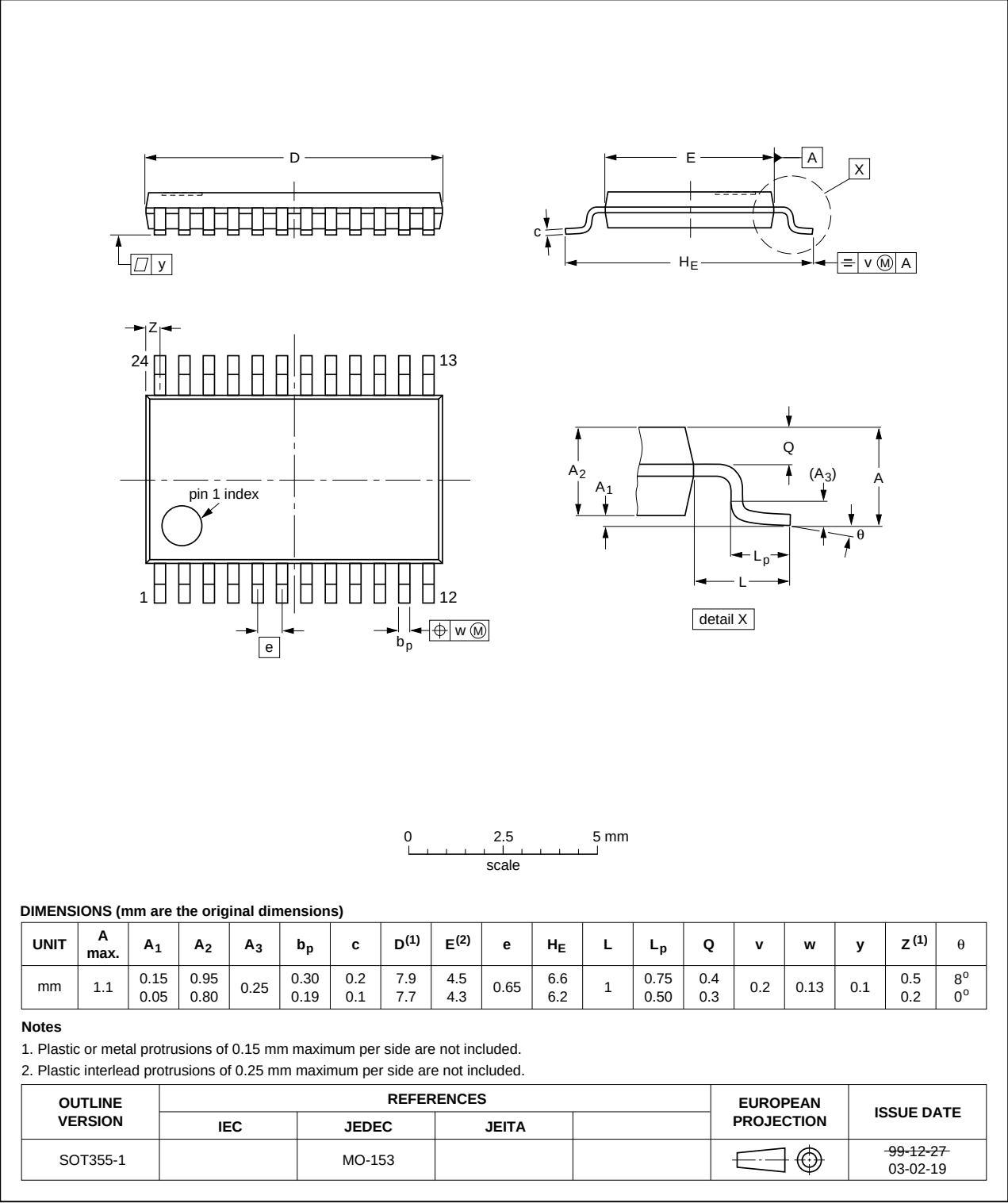


Fig 11. Package outline SOT355-1 (TSSOP24)

## 13. Abbreviations

Table 11. Abbreviations

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

## 14. Revision history

Table 12. Revision history

| Document ID    | Release date                                                                                                                                                                                                                                         | Data sheet status     | Change notice | Supersedes    |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|---------------|
| 74LVT2952 v.4  | 20130911                                                                                                                                                                                                                                             | Product data sheet    | -             | 74LVT2952 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></ul> |                       |               |               |
| 74LVT2952 v.3  | 20040907                                                                                                                                                                                                                                             | Product specification | -             | -             |

## 15. Legal information

### 15.1 Data sheet status

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

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

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

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

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Date of release: 11 September 2013

Document identifier: 74LVT2952

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