

# 74ABT827

10-bit buffer/line driver; non-inverting; 3-state

Rev. 5 — 7 November 2011

Product data sheet

## 1. General description

The 74ABT827 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 74ABT827 10-bit buffers provide high performance bus interface buffering for wide data/address paths or buses carrying parity. They have NOR Output Enables ( $\overline{OE0}$ ,  $\overline{OE1}$ ) for maximum control flexibility.

## 2. Features and benefits

- Ideal where high speed, light loading, or increased fan-in are required
- Flow-through pinout architecture for microprocessor oriented applications
- Output capability: +64 mA and –32 mA
- Power-up 3-state
- Inputs are disabled during 3-state mode
- Latch-up protection exceeds 500 mA per JESD78B class II level A
- ESD protection:
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V

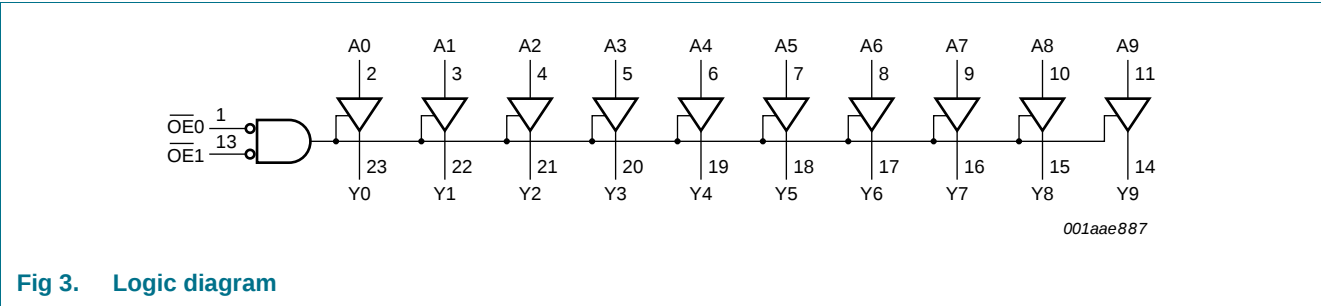
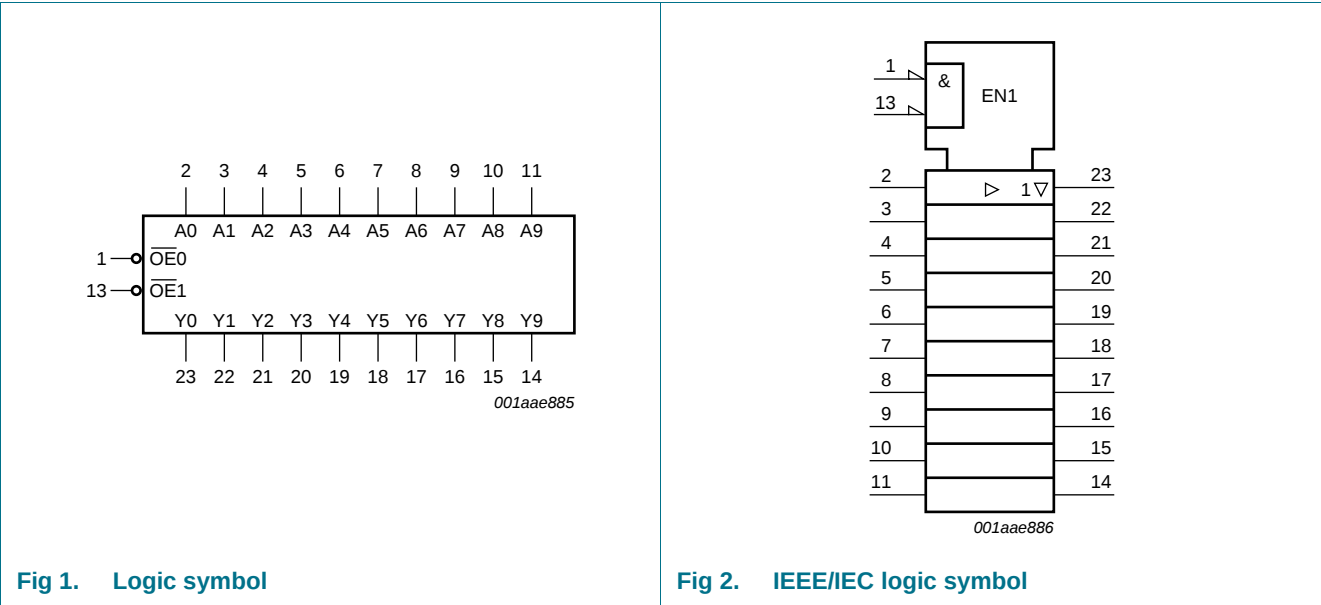
## 3. Ordering information

Table 1. Ordering information

| Type number | Package           |         |                                                                        |          |
|-------------|-------------------|---------|------------------------------------------------------------------------|----------|
|             | Temperature range | Name    | Description                                                            | Version  |
| 74ABT827D   | –40 °C to +85 °C  | SO24    | plastic small outline package; 24 leads; body width 7.5 mm             | SOT137-1 |
| 74ABT827DB  | –40 °C to +85 °C  | SSOP24  | plastic shrink small outline package; 24 leads; body width 5.3 mm      | SOT340-1 |
| 74ABT827PW  | –40 °C to +85 °C  | TSSOP24 | plastic thin shrink small outline package; 24 leads; body width 4.4 mm | SOT355-1 |



4. Functional diagram



5. Pinning information

5.1 Pinning

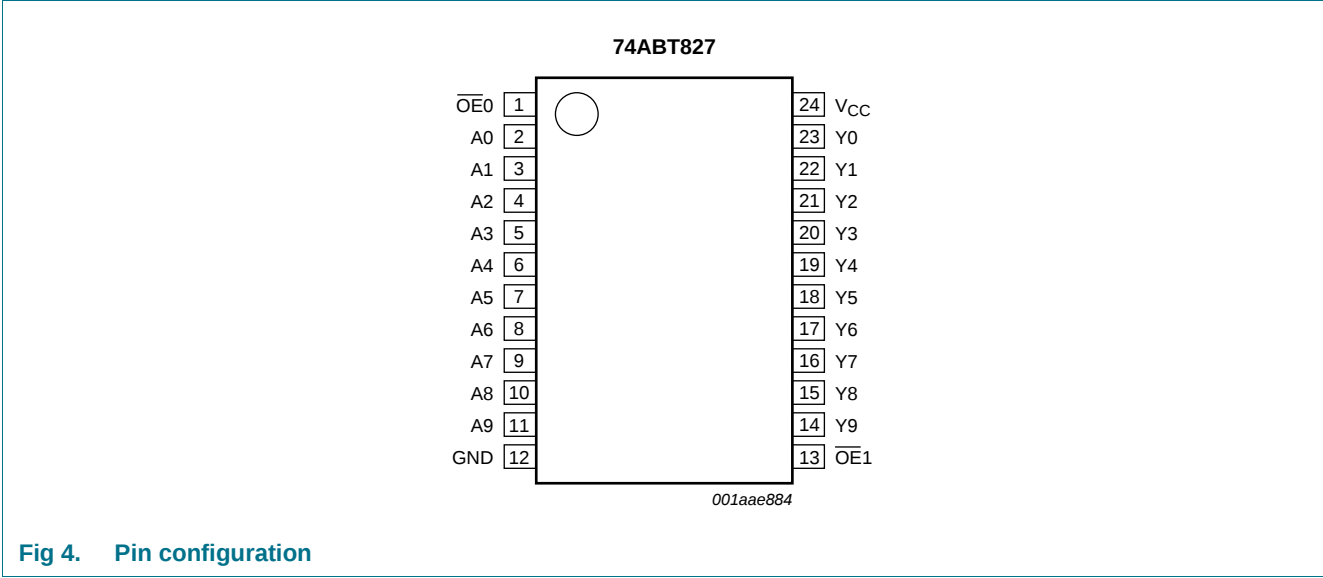


Fig 4. Pin configuration

5.2 Pin description

Table 2. Pin description

| Symbol   | Pin                                    | Description                      |
|----------|----------------------------------------|----------------------------------|
| OE0      | 1                                      | output enable input (active LOW) |
| A0 to A9 | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11         | data input                       |
| GND      | 12                                     | ground (0 V)                     |
| OE1      | 13                                     | output enable input (active LOW) |
| Y0 to Y9 | 23, 22, 21, 20, 19, 18, 17, 16, 15, 14 | data output                      |
| VCC      | 24                                     | supply voltage                   |

6. Functional description

6.1 Function table

Table 3. Function table<sup>[1]</sup>

| Inputs          |                | Output         | Operating mode |
|-----------------|----------------|----------------|----------------|
| OE <sub>n</sub> | A <sub>n</sub> | Y <sub>n</sub> |                |
| L               | L              | L              | transparent    |
| L               | H              | H              | transparent    |
| H               | X              | Z              | high-impedance |

[1] H = HIGH voltage level;  
L = LOW voltage level;  
X = don t care;  
Z = high-impedance OFF-state.

## 7. Limiting values

**Table 4. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol    | Parameter               | Conditions                        | Min      | Max  | Unit |
|-----------|-------------------------|-----------------------------------|----------|------|------|
| $V_{CC}$  | supply voltage          |                                   | -0.5     | +7.0 | V    |
| $V_I$     | input voltage           |                                   | [1] -1.2 | +7.0 | V    |
| $V_O$     | output voltage          | output in OFF-state or HIGH-state | [1] -0.5 | +5.5 | V    |
| $I_{IK}$  | input clamping current  | $V_I < 0$ V                       | -18      | -    | mA   |
| $I_{OK}$  | output clamping current | $V_O < 0$ V                       | -50      | -    | mA   |
| $I_O$     | output current          | output in LOW-state               | -        | 128  | mA   |
| $T_j$     | junction temperature    |                                   | [2] -    | 150  | °C   |
| $T_{stg}$ | storage temperature     |                                   | -65      | +150 | °C   |

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

[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.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

| Symbol              | Parameter                           | Conditions  | Min | Typ | Max      | Unit |
|---------------------|-------------------------------------|-------------|-----|-----|----------|------|
| $V_{CC}$            | supply voltage                      |             | 4.5 | -   | 5.5      | V    |
| $V_I$               | input voltage                       |             | 0   | -   | $V_{CC}$ | V    |
| $V_{IH}$            | HIGH-level input voltage            |             | 2.0 | -   | -        | V    |
| $V_{IL}$            | LOW-level input voltage             |             | -   | -   | 0.8      | V    |
| $I_{OH}$            | HIGH-level output current           |             | -32 | -   | -        | mA   |
| $I_{OL}$            | LOW-level output current            |             | -   | -   | 64       | mA   |
| $\Delta t/\Delta V$ | input transition rise and fall rate |             | 0   | -   | 5        | ns/V |
| $T_{amb}$           | ambient temperature                 | in free air | -40 | -   | +85      | °C   |

## 9. Static characteristics

Table 6. Static characteristics

| Symbol                | Parameter                          | Conditions                                                                                                                 | 25 °C               |       |      | –40 °C to +85 °C |      | Unit |    |
|-----------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------|-------|------|------------------|------|------|----|
|                       |                                    |                                                                                                                            | Min                 | Typ   | Max  | Min              | Max  |      |    |
| V <sub>IK</sub>       | input clamping voltage             | V <sub>CC</sub> = 4.5 V; I <sub>IK</sub> = –18 mA                                                                          | –1.2                | –0.9  | -    | –1.2             | -    | V    |    |
| V <sub>OH</sub>       | HIGH-level output voltage          | V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                                                                        |                     |       |      |                  |      |      |    |
|                       |                                    | V <sub>CC</sub> = 4.5 V; I <sub>OH</sub> = –3 mA                                                                           | 2.5                 | 2.9   | -    | 2.5              | -    | V    |    |
|                       |                                    | V <sub>CC</sub> = 5.0 V; I <sub>OH</sub> = –3 mA                                                                           | 3.0                 | 3.4   | -    | 3.0              | -    | V    |    |
|                       |                                    | V <sub>CC</sub> = 4.5 V; I <sub>OH</sub> = –32 mA                                                                          | 2.0                 | 2.4   | -    | 2.0              | -    | V    |    |
| V <sub>OL</sub>       | LOW-level output voltage           | V <sub>CC</sub> = 4.5 V; I <sub>OL</sub> = 64 mA;<br>V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                   | -                   | 0.42  | 0.55 | -                | 0.55 | V    |    |
| I <sub>I</sub>        | input leakage current              | V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or 5.5 V                                                                     | -                   | ±0.01 | ±1.0 | -                | ±1.0 | μA   |    |
| I <sub>OFF</sub>      | power-off leakage current          | V <sub>CC</sub> = 0 V; V <sub>I</sub> or V <sub>O</sub> ≤ 4.5 V                                                            | -                   | ±5.0  | ±100 | -                | ±100 | μA   |    |
| I <sub>O(pu/pd)</sub> | power-up/power-down output current | V <sub>CC</sub> = 2.0 V; V <sub>O</sub> = 0.5 V;<br>V <sub>I</sub> = GND or V <sub>CC</sub> ; $\overline{\text{OEn}}$ HIGH | <a href="#">[1]</a> | -     | ±5.0 | ±50              | -    | ±50  | μA |
| I <sub>OZ</sub>       | OFF-state output current           | V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                                               |                     |       |      |                  |      |      |    |
|                       |                                    | V <sub>O</sub> = 2.7 V                                                                                                     | -                   | 5.0   | 50   | -                | 50   | μA   |    |
|                       |                                    | V <sub>O</sub> = 0.5 V                                                                                                     | -                   | –5.0  | –50  | -                | –50  | μA   |    |
| I <sub>LO</sub>       | output leakage current             | HIGH-state; V <sub>O</sub> = 5.5 V;<br>V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or V <sub>CC</sub>                    | -                   | 5.0   | 50   | -                | 50   | μA   |    |
| I <sub>O</sub>        | output current                     | V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = 2.5 V                                                                            | <a href="#">[2]</a> | –180  | –80  | –50              | –180 | –50  | mA |
| I <sub>CC</sub>       | supply current                     | V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or V <sub>CC</sub>                                                           |                     |       |      |                  |      |      |    |
|                       |                                    | outputs HIGH-state                                                                                                         | -                   | 0.5   | 250  | -                | 250  | μA   |    |
|                       |                                    | outputs LOW-state                                                                                                          | -                   | 25    | 38   | -                | 38   | mA   |    |
|                       |                                    | outputs disabled                                                                                                           | -                   | 0.5   | 250  | -                | 250  | μA   |    |
| ΔI <sub>CC</sub>      | additional supply current          | per input pin; V <sub>CC</sub> = 5.5 V; one input at 3.4 V; other inputs at V <sub>CC</sub> or GND                         | <a href="#">[3]</a> |       |      |                  |      |      |    |
|                       |                                    | outputs enabled                                                                                                            | -                   | 0.5   | 1.5  | -                | 1.5  | mA   |    |
|                       |                                    | outputs 3-state, one data input                                                                                            | -                   | 0.01  | 50   | -                | 50   | mA   |    |
|                       |                                    | outputs 3-state; one enable input                                                                                          | -                   | 0.5   | 1.5  | -                | 1.5  | mA   |    |
| C <sub>I</sub>        | input capacitance                  | V <sub>I</sub> = 0 V or V <sub>CC</sub>                                                                                    | -                   | 4     | -    | -                | -    | pF   |    |
| C <sub>O</sub>        | output capacitance                 | outputs disabled; V <sub>O</sub> = 0 V or V <sub>CC</sub>                                                                  | -                   | 7     | -    | -                | -    | pF   |    |

[1] This parameter is valid for any  $V_{CC}$  between 0 V and 2.1 V with a transition time of up to 10 ms. For  $V_{CC} = 2.1\text{ V}$  to  $V_{CC} = 5\text{ V} \pm 10\%$ , a transition time of up to 100  $\mu\text{s}$  is permitted.

[2] Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

[3] This is the increase in supply current for each input at 3.4 V.

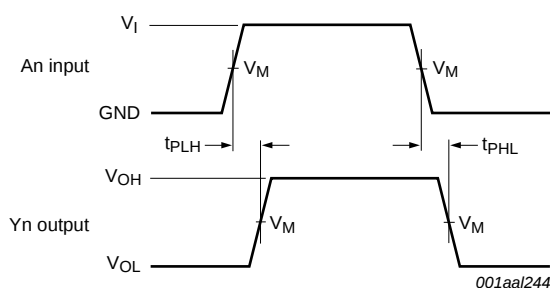
## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

$GND = 0\text{ V}$ ; for test circuit, see [Figure 7](#).

| Symbol    | Parameter                           | Conditions                                               | 25 °C;<br>$V_{CC} = 5.0\text{ V}$ |     |     | –40 °C to +85 °C;<br>$V_{CC} = 5.0\text{ V} \pm 0.5\text{ V}$ |     | Unit |
|-----------|-------------------------------------|----------------------------------------------------------|-----------------------------------|-----|-----|---------------------------------------------------------------|-----|------|
|           |                                     |                                                          | Min                               | Typ | Max | Min                                                           | Max |      |
| $t_{PLH}$ | LOW to HIGH propagation delay       | $A_n$ to $Y_n$ ; see <a href="#">Figure 5</a>            | 1.1                               | 3.0 | 4.4 | 1.1                                                           | 4.8 | ns   |
| $t_{PHL}$ | HIGH to LOW propagation delay       | $A_n$ to $Y_n$ ; see <a href="#">Figure 5</a>            | 1.1                               | 2.9 | 4.1 | 1.1                                                           | 4.7 | ns   |
| $t_{PZH}$ | OFF-state to HIGH propagation delay | $\overline{OEn}$ to $Y_n$ ; see <a href="#">Figure 6</a> | 1.6                               | 3.7 | 5.1 | 1.6                                                           | 5.9 | ns   |
| $t_{PZL}$ | OFF-state to LOW propagation delay  | $\overline{OEn}$ to $Y_n$ ; see <a href="#">Figure 6</a> | 2.6                               | 4.6 | 5.9 | 2.6                                                           | 6.9 | ns   |
| $t_{PHZ}$ | HIGH to OFF-state propagation delay | $\overline{OEn}$ to $Y_n$ ; see <a href="#">Figure 6</a> | 2.0                               | 4.8 | 6.3 | 2.0                                                           | 6.8 | ns   |
| $t_{PLZ}$ | LOW to OFF-state propagation delay  | $\overline{OEn}$ to $Y_n$ ; see <a href="#">Figure 6</a> | 2.5                               | 5.1 | 6.6 | 2.5                                                           | 6.9 | ns   |

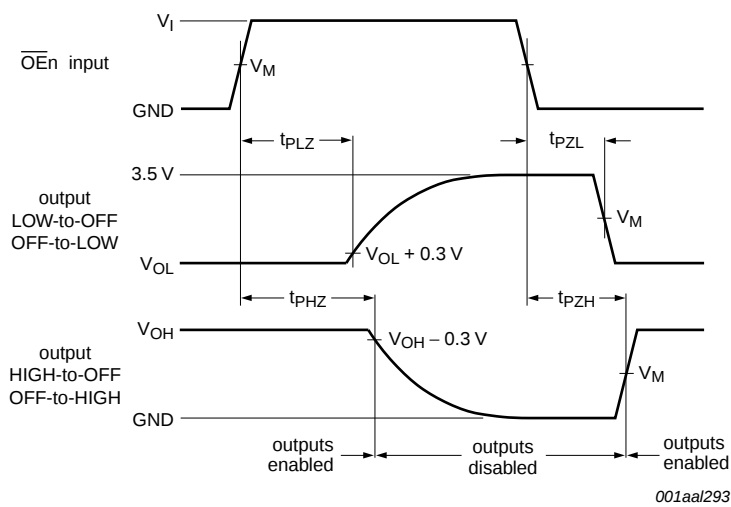
## 11. Waveforms



$V_M = 1.5\text{ V}$

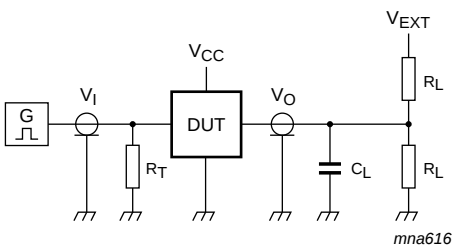
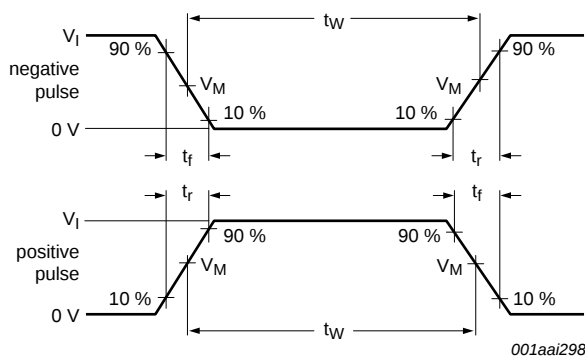
$V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig 5. Propagation delay input ( $A_n$ ) to output ( $Y_n$ )**



$V_M = 1.5\text{ V}$   
 $V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

Fig 6. 3-state enable and disable times



- a. Input pulse definition
- Test data and  $V_{EXT}$  levels are given in [Table 8](#).
- $R_L$  = 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.
- $V_{EXT}$  = Test voltage for switching times.
- b. Test circuit

Fig 7. Test circuit for measuring switching times

Table 8. Test data

| Input |       |        |                      | Load  |              | $V_{EXT}$          |                    |                    |
|-------|-------|--------|----------------------|-------|--------------|--------------------|--------------------|--------------------|
| $V_I$ | $f_i$ | $t_w$  | $t_r, t_f$           | $C_L$ | $R_L$        | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 3.0 V | 1 MHz | 500 ns | $\leq 2.5\text{ ns}$ | 50 pF | 500 $\Omega$ | open               | open               | 7.0 V              |

12. Package outline

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

SOT137-1

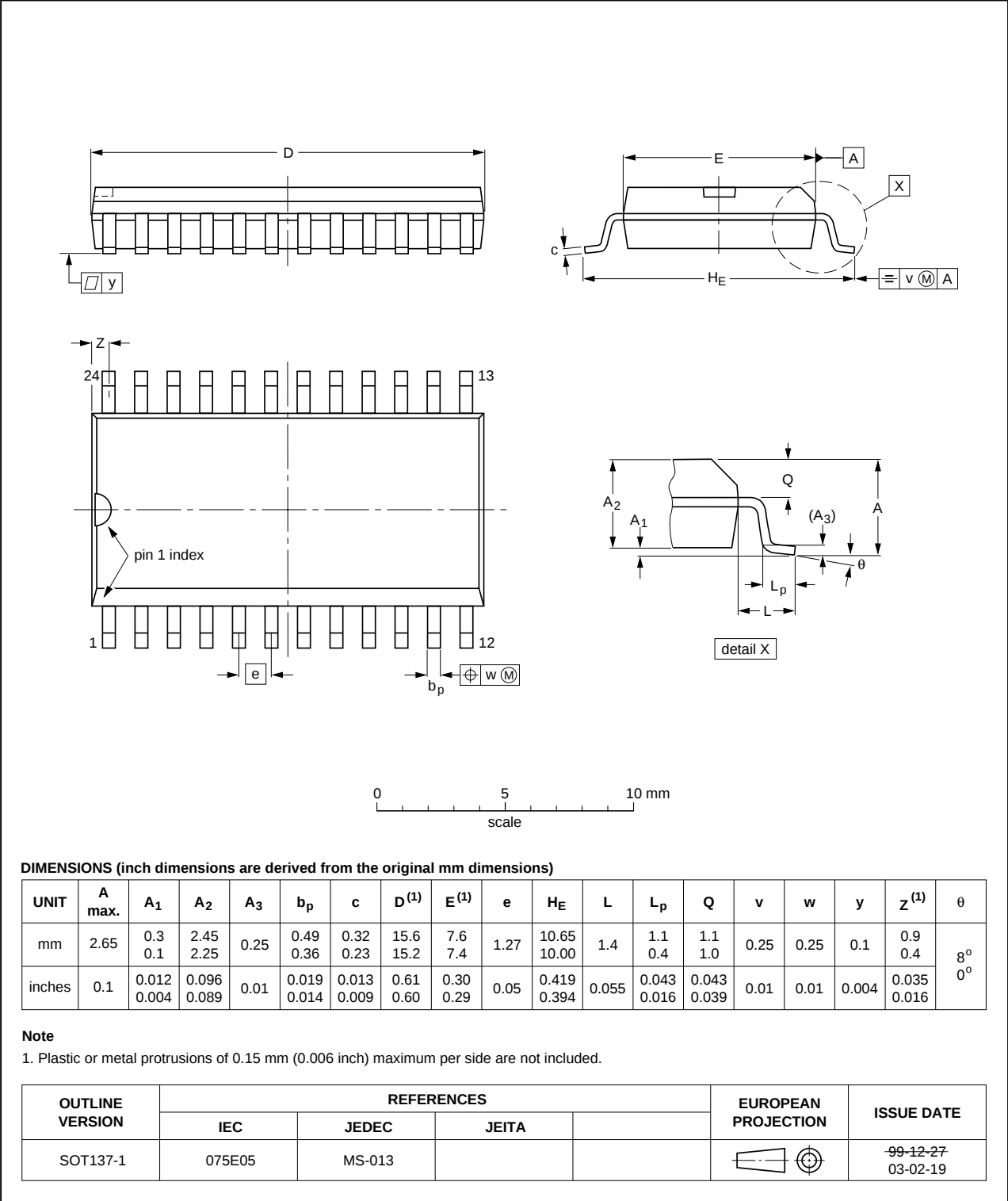


Fig 8. Package outline SOT137-1 (SO24)

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

SOT340-1

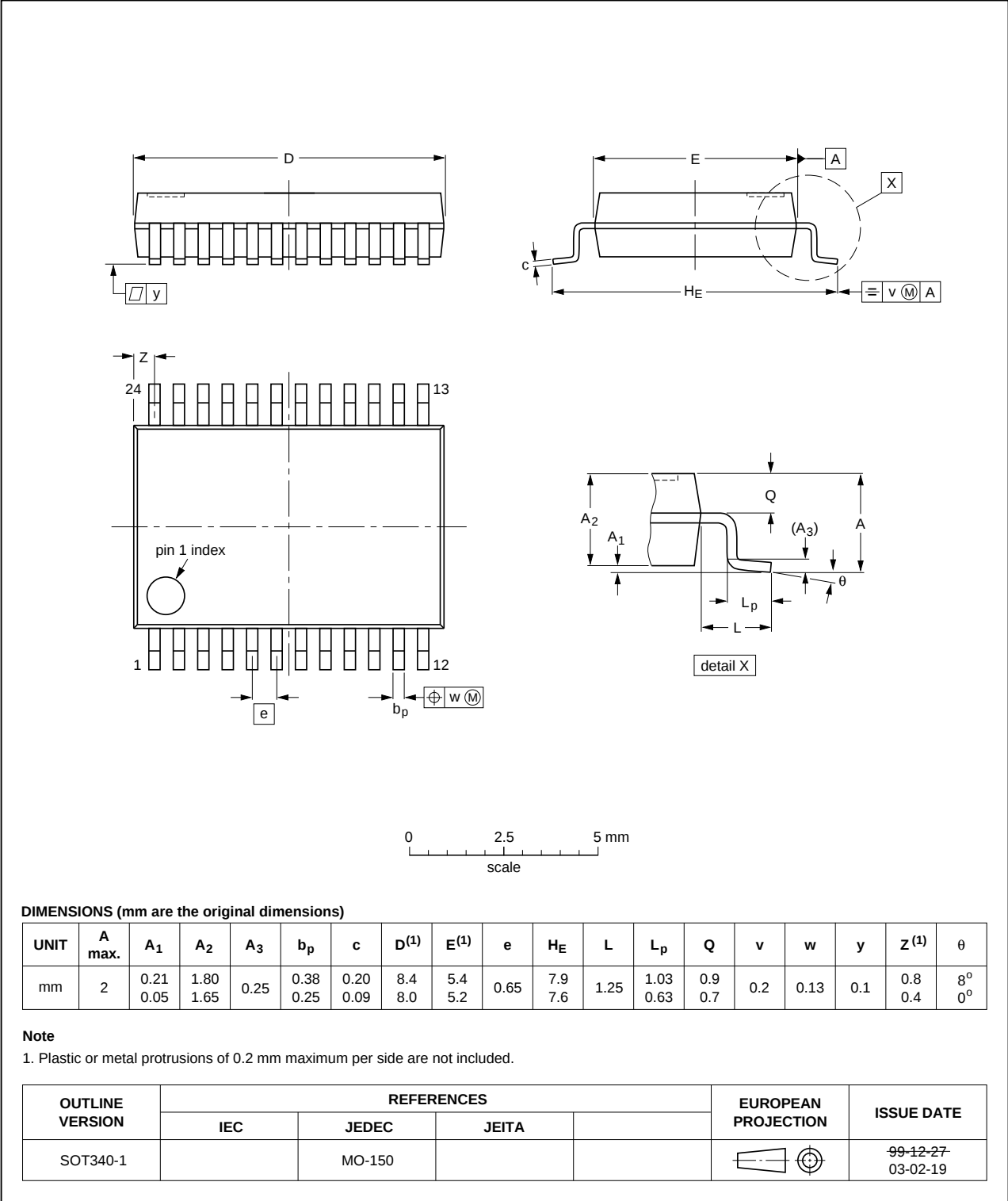


Fig 9. Package outline SOT340-1 (SSOP24)

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

SOT355-1

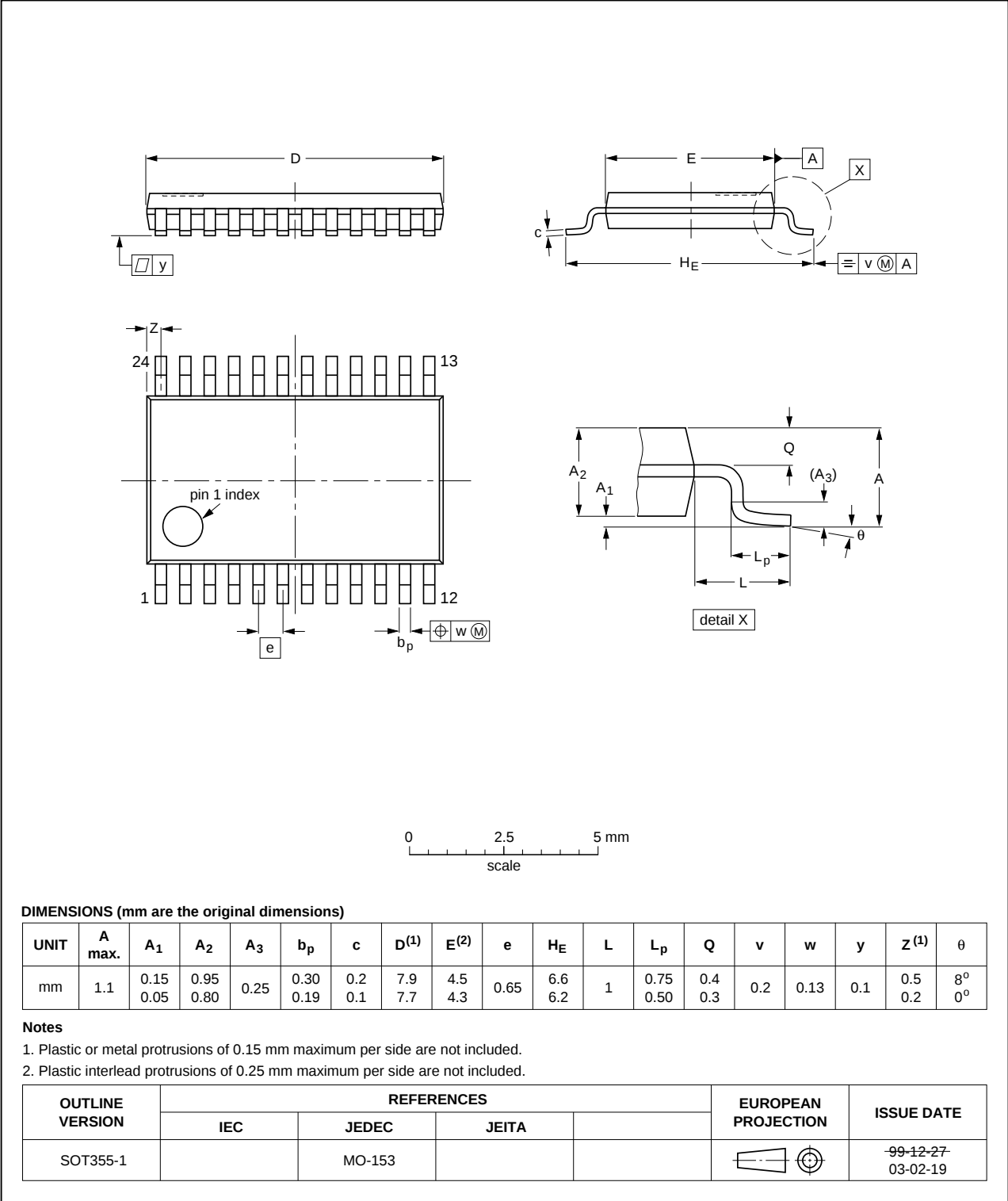


Fig 10. Package outline SOT355-1 (TSSOP24)

## 13. Abbreviations

Table 9. Abbreviations

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

## 14. Revision history

Table 10. Revision history

| Document ID    | Release date           | Data sheet status     | Change notice | Supersedes   |
|----------------|------------------------|-----------------------|---------------|--------------|
| 74ABT827 v.5   | 20111107               | Product data sheet    | -             | 74ABT827 v.4 |
| Modifications: | • Legal pages updated. |                       |               |              |
| 74ABT827 v.4   | 20100401               | Product data sheet    | -             | 74ABT827 v.3 |
| 74ABT827 v.3   | 20100224               | Product data sheet    | -             | 74ABT827 v.2 |
| 74ABT827 v.2   | 19980116               | Product specification | -             | 74ABT827 v.1 |
| 74ABT827 v.1   | 19950906               | 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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