



# THE DATASHEET OF 74AUP2G125GD,125



# 74AUP2G125

Low-power dual buffer/line driver; 3-state

Rev. 16 — 12 August 2024

Product data sheet

## 1. General description

The 74AUP2G125 is a dual buffer/line driver with 3-state outputs controlled by the output enable inputs ( $\overline{nOE}$ ). Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times. This device ensures very low static and dynamic power consumption across the entire  $V_{CC}$  range from 0.8 V to 3.6 V.

This device is fully specified for partial power down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

## 2. Features and benefits

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- CMOS low power dissipation
- Low static power consumption;  $I_{CC} = 0.9 \mu A$  (maximum)
- Latch-up performance exceeds 100 mA per JESD78B Class II
- Overvoltage tolerant inputs to 3.6 V
- Low noise overshoot and undershoot  $< 10\%$  of  $V_{CC}$
- Input-disable feature allows floating input conditions
- $I_{OFF}$  circuitry provides partial Power-down mode operation
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Complies with JEDEC standards:
  - JESD8-12 (0.8 V to 1.3 V)
  - JESD8-11 (0.9 V to 1.65 V)
  - JESD8-7 (1.2 V to 1.95 V)
  - JESD8-5 (1.8 V to 2.7 V)
  - JESD8-B (2.7 V to 3.6 V)
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 3A exceeds 5000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Multiple package options
- Specified from  $-40\text{ }^{\circ}C$  to  $+85\text{ }^{\circ}C$  and  $-40\text{ }^{\circ}C$  to  $+125\text{ }^{\circ}C$

3. Ordering information

Table 1. Ordering information

| Type number                  | Package           |        |                                                                                                                 |                           |
|------------------------------|-------------------|--------|-----------------------------------------------------------------------------------------------------------------|---------------------------|
|                              | Temperature range | Name   | Description                                                                                                     | Version                   |
| <a href="#">74AUP2G125DC</a> | -40 °C to +125 °C | VSSOP8 | plastic very thin shrink small outline package; 8 leads; body width 2.3 mm                                      | <a href="#">SOT765-1</a>  |
| <a href="#">74AUP2G125GT</a> | -40 °C to +125 °C | XSON8  | plastic extremely thin small outline package; no leads; 8 terminals; body 1 × 1.95 × 0.5 mm                     | <a href="#">SOT833-1</a>  |
| <a href="#">74AUP2G125GN</a> | -40 °C to +125 °C | XSON8  | extremely thin small outline package; no leads; 8 terminals; body 1.2 × 1.0 × 0.35 mm                           | <a href="#">SOT1116</a>   |
| <a href="#">74AUP2G125GS</a> | -40 °C to +125 °C | XSON8  | extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1.0 × 0.35 mm                          | <a href="#">SOT1203</a>   |
| <a href="#">74AUP2G125GX</a> | -40 °C to +125 °C | X2SON8 | plastic thermal enhanced extremely thin small outline package; no leads; 8 terminals; body 1.35 × 0.8 × 0.32 mm | <a href="#">SOT1233-2</a> |

4. Marking

Table 2. Marking codes

| Type number  | Marking code[1] |
|--------------|-----------------|
| 74AUP2G125DC | p25             |
| 74AUP2G125GT | p25             |
| 74AUP2G125GN | aM              |
| 74AUP2G125GS | aM              |
| 74AUP2G125GX | aM              |

[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

5. Functional diagram

001aah931

**Fig. 1. Logic symbol**

001aah932

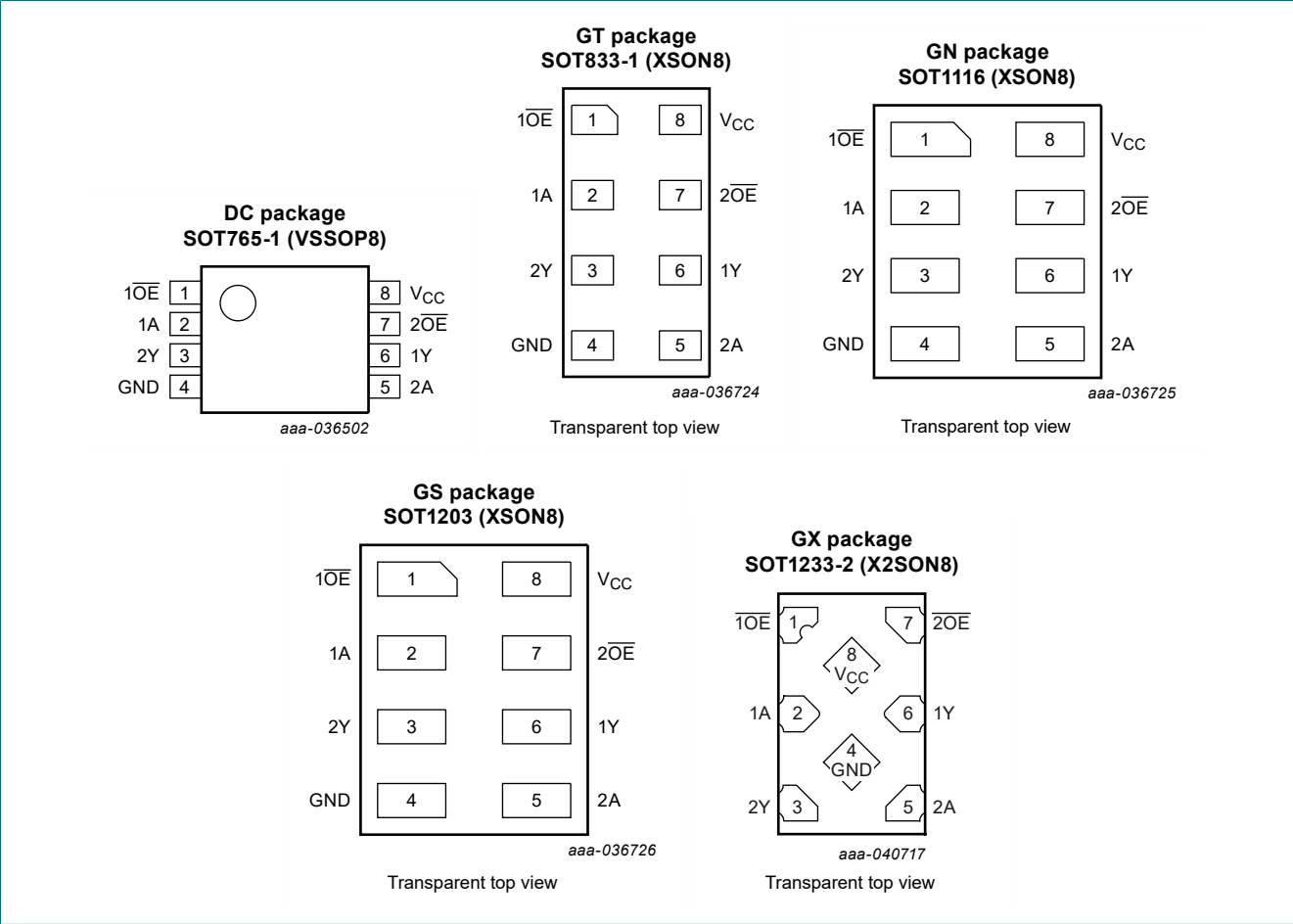
**Fig. 2. IEC logic symbol**

mna227

**Fig. 3. Logic diagram (one gate)**

6. Pinning information

6.1. Pinning



6.2. Pin description

Table 3. Pin description

| Symbol   | Pin  | Description                      |
|----------|------|----------------------------------|
| 1OE, 2OE | 1, 7 | output enable input (active LOW) |
| 1A, 2A   | 2, 5 | data input                       |
| GND      | 4    | ground (0 V)                     |
| 1Y, 2Y   | 6, 3 | data output                      |
| VCC      | 8    | supply voltage                   |

7. Functional description

Table 4. Function table

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

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

8. Limiting values

Table 5. Limiting values

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

| Symbol           | Parameter               | Conditions                                                                      | Min  | Max  | Unit |
|------------------|-------------------------|---------------------------------------------------------------------------------|------|------|------|
| V <sub>CC</sub>  | supply voltage          |                                                                                 | -0.5 | +4.6 | V    |
| V <sub>I</sub>   | input voltage           | [1]                                                                             | -0.5 | +4.6 | V    |
| V <sub>O</sub>   | output voltage          | Active mode and Power-down mode [1]                                             | -0.5 | +4.6 | 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          | V <sub>O</sub> = 0 V to V <sub>CC</sub>                                         | -    | ±20  | mA   |
| I <sub>CC</sub>  | supply current          |                                                                                 | -    | +50  | mA   |
| I <sub>GND</sub> | ground current          |                                                                                 | -50  | -    | mA   |
| T <sub>stg</sub> | storage temperature     |                                                                                 | -65  | +150 | °C   |
| P <sub>tot</sub> | total power dissipation | T <sub>amb</sub> = -40 °C to +125 °C                                            |      |      |      |
|                  |                         | SOT765-1 (VSSOP8)<br>SOT833-1 (XSON8)<br>SOT1116 (XSON8)<br>SOT1203 (XSON8) [2] | -    | 250  | mW   |
|                  |                         | SOT1233-2 (X2SON8) [3]                                                          | -    | 300  | mW   |

- [1] The minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.
- [2] For SOT765-1 (VSSOP8) package: P<sub>tot</sub> derates linearly with 4.9 mW/K above 99 °C.  
For SOT833-1 (XSON8) package: P<sub>tot</sub> derates linearly with 3.1 mW/K above 68 °C.  
For SOT1116 (XSON8) package: P<sub>tot</sub> derates linearly with 4.2 mW/K above 90 °C.  
For SOT1203 (XSON8) package: P<sub>tot</sub> derates linearly with 3.6 mW/K above 81 °C.
- [3] For SOT1233-2 (X2SON8) package: P<sub>tot</sub> derates linearly with 7.7 mW/K above 118 °C.

9. Recommended operating conditions

Table 6. Operating conditions

| Symbol           | Parameter                           | Conditions                             | Min | Max             | Unit |
|------------------|-------------------------------------|----------------------------------------|-----|-----------------|------|
| V <sub>CC</sub>  | supply voltage                      |                                        | 0.8 | 3.6             | V    |
| V <sub>I</sub>   | input voltage                       |                                        | 0   | 3.6             | V    |
| V <sub>O</sub>   | output voltage                      | Active mode                            | 0   | V <sub>CC</sub> | V    |
|                  |                                     | Power-down mode; V <sub>CC</sub> = 0 V | 0   | 3.6             | V    |
| T <sub>amb</sub> | ambient temperature                 |                                        | -40 | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 0.8 V to 3.6 V       | -   | 200             | ns/V |

## 10. Static characteristics

**Table 7. Static characteristics**

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

| Symbol                         | Parameter                            | Conditions                                                                                                                     | Min                    | Typ | Max                    | Unit |
|--------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------|-----|------------------------|------|
| <b>T<sub>amb</sub> = 25 °C</b> |                                      |                                                                                                                                |                        |     |                        |      |
| V <sub>IH</sub>                | HIGH-level input voltage             | V <sub>CC</sub> = 0.8 V                                                                                                        | 0.70 × V <sub>CC</sub> | -   | -                      | V    |
|                                |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V                                                                                              | 0.65 × V <sub>CC</sub> | -   | -                      | V    |
|                                |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V                                                                                               | 1.6                    | -   | -                      | V    |
|                                |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V                                                                                               | 2.0                    | -   | -                      | V    |
| V <sub>IL</sub>                | LOW-level input voltage              | V <sub>CC</sub> = 0.8 V                                                                                                        | -                      | -   | 0.30 × V <sub>CC</sub> | V    |
|                                |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V                                                                                              | -                      | -   | 0.35 × V <sub>CC</sub> | V    |
|                                |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V                                                                                               | -                      | -   | 0.7                    | V    |
|                                |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V                                                                                               | -                      | -   | 0.9                    | V    |
| V <sub>OH</sub>                | HIGH-level output voltage            | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                            |                        |     |                        |      |
|                                |                                      | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V                                                                      | V <sub>CC</sub> - 0.1  | -   | -                      | V    |
|                                |                                      | I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V                                                                              | 0.75 × V <sub>CC</sub> | -   | -                      | V    |
|                                |                                      | I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V                                                                              | 1.11                   | -   | -                      | V    |
|                                |                                      | I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V                                                                             | 1.32                   | -   | -                      | V    |
|                                |                                      | I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V                                                                              | 2.05                   | -   | -                      | V    |
|                                |                                      | I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V                                                                              | 1.9                    | -   | -                      | V    |
|                                |                                      | I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V                                                                              | 2.72                   | -   | -                      | V    |
|                                |                                      | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V                                                                              | 2.6                    | -   | -                      | V    |
| V <sub>OL</sub>                | LOW-level output voltage             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                            |                        |     |                        |      |
|                                |                                      | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V                                                                       | -                      | -   | 0.1                    | V    |
|                                |                                      | I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V                                                                               | -                      | -   | 0.3 × V <sub>CC</sub>  | V    |
|                                |                                      | I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V                                                                               | -                      | -   | 0.31                   | V    |
|                                |                                      | I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V                                                                              | -                      | -   | 0.31                   | V    |
|                                |                                      | I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V                                                                               | -                      | -   | 0.31                   | V    |
|                                |                                      | I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V                                                                               | -                      | -   | 0.44                   | V    |
|                                |                                      | I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V                                                                               | -                      | -   | 0.31                   | V    |
|                                |                                      | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V                                                                               | -                      | -   | 0.44                   | V    |
| I <sub>I</sub>                 | input leakage current                | V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V                                                                  | -                      | -   | ±0.1                   | µA   |
| I <sub>OZ</sub>                | OFF-state output current             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = 0 V to 3.6 V;<br>V <sub>CC</sub> = 0 V to 3.6 V         | -                      | -   | ±0.1                   | µA   |
| I <sub>OFF</sub>               | power-off leakage current            | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V                                                         | -                      | -   | ±0.2                   | µA   |
| ΔI <sub>OFF</sub>              | additional power-off leakage current | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V;<br>V <sub>CC</sub> = 0 V to 0.2 V                                             | -                      | -   | ±0.2                   | µA   |
| I <sub>CC</sub>                | supply current                       | V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 0.8 V to 3.6 V                            | -                      | -   | 0.5                    | µA   |
| ΔI <sub>CC</sub>               | additional supply current            | data input; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; [1]<br>V <sub>CC</sub> = 3.3 V                     | -                      | -   | 40                     | µA   |
|                                |                                      | n $\overline{\text{OE}}$ input; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; [1]<br>V <sub>CC</sub> = 3.3 V | -                      | -   | 110                    | µA   |
|                                |                                      | all inputs; V <sub>I</sub> = GND to 3.6 V;<br>n $\overline{\text{OE}}$ = GND; V <sub>CC</sub> = 0.8 V to 3.6 V [2]             | -                      | -   | 1                      | µA   |

| Symbol                              | Parameter                            | Conditions                                                                                                                     | Min                    | Typ | Max                    | Unit |
|-------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------|-----|------------------------|------|
| C <sub>I</sub>                      | input capacitance                    | V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND or V <sub>CC</sub>                                                        | -                      | 0.8 | -                      | pF   |
| C <sub>O</sub>                      | output capacitance                   | output enabled; V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V                                                                    | -                      | 1.4 | -                      | pF   |
|                                     |                                      | output disabled;<br>V <sub>O</sub> = GND or V <sub>CC</sub> = 0 V;<br>V <sub>CC</sub> = 0 V to 3.6 V                           | -                      | 1.3 | -                      | pF   |
| T <sub>amb</sub> = -40 °C to +85 °C |                                      |                                                                                                                                |                        |     |                        |      |
| V <sub>IH</sub>                     | HIGH-level input voltage             | V <sub>CC</sub> = 0.8 V                                                                                                        | 0.70 × V <sub>CC</sub> | -   | -                      | V    |
|                                     |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V                                                                                              | 0.65 × V <sub>CC</sub> | -   | -                      | V    |
|                                     |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V                                                                                               | 1.6                    | -   | -                      | V    |
|                                     |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V                                                                                               | 2.0                    | -   | -                      | V    |
| V <sub>IL</sub>                     | LOW-level input voltage              | V <sub>CC</sub> = 0.8 V                                                                                                        | -                      | -   | 0.30 × V <sub>CC</sub> | V    |
|                                     |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V                                                                                              | -                      | -   | 0.35 × V <sub>CC</sub> | V    |
|                                     |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V                                                                                               | -                      | -   | 0.7                    | V    |
|                                     |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V                                                                                               | -                      | -   | 0.9                    | V    |
| V <sub>OH</sub>                     | HIGH-level output voltage            | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                            |                        |     |                        |      |
|                                     |                                      | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V                                                                      | V <sub>CC</sub> - 0.1  | -   | -                      | V    |
|                                     |                                      | I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V                                                                              | 0.7 × V <sub>CC</sub>  | -   | -                      | V    |
|                                     |                                      | I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V                                                                              | 1.03                   | -   | -                      | V    |
|                                     |                                      | I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V                                                                             | 1.30                   | -   | -                      | V    |
|                                     |                                      | I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V                                                                              | 1.97                   | -   | -                      | V    |
|                                     |                                      | I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V                                                                              | 1.85                   | -   | -                      | V    |
|                                     |                                      | I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V                                                                              | 2.67                   | -   | -                      | V    |
|                                     |                                      | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V                                                                              | 2.55                   | -   | -                      | V    |
| V <sub>OL</sub>                     | LOW-level output voltage             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                            |                        |     |                        |      |
|                                     |                                      | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V                                                                       | -                      | -   | 0.1                    | V    |
|                                     |                                      | I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V                                                                               | -                      | -   | 0.3 × V <sub>CC</sub>  | V    |
|                                     |                                      | I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V                                                                               | -                      | -   | 0.37                   | V    |
|                                     |                                      | I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V                                                                              | -                      | -   | 0.35                   | V    |
|                                     |                                      | I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V                                                                               | -                      | -   | 0.33                   | V    |
|                                     |                                      | I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V                                                                               | -                      | -   | 0.45                   | V    |
|                                     |                                      | I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V                                                                               | -                      | -   | 0.33                   | V    |
|                                     |                                      | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V                                                                               | -                      | -   | 0.45                   | V    |
| I <sub>I</sub>                      | input leakage current                | V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V                                                                  | -                      | -   | ±0.5                   | μA   |
| I <sub>OZ</sub>                     | OFF-state output current             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = 0 V to 3.6 V;<br>V <sub>CC</sub> = 0 V to 3.6 V         | -                      | -   | ±0.5                   | μA   |
| I <sub>OFF</sub>                    | power-off leakage current            | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V                                                         | -                      | -   | ±0.5                   | μA   |
| ΔI <sub>OFF</sub>                   | additional power-off leakage current | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V;<br>V <sub>CC</sub> = 0 V to 0.2 V                                             | -                      | -   | ±0.6                   | μA   |
| I <sub>CC</sub>                     | supply current                       | V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 0.8 V to 3.6 V                            | -                      | -   | 0.9                    | μA   |
| ΔI <sub>CC</sub>                    | additional supply current            | data input; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; [1]<br>V <sub>CC</sub> = 3.3 V                     | -                      | -   | 50                     | μA   |
|                                     |                                      | n $\overline{\text{OE}}$ input; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; [1]<br>V <sub>CC</sub> = 3.3 V | -                      | -   | 120                    | μA   |
|                                     |                                      | all inputs; V <sub>I</sub> = GND to 3.6 V;<br>n $\overline{\text{OE}}$ = GND; V <sub>CC</sub> = 0.8 V to 3.6 V [2]             | -                      | -   | 1                      | μA   |

| Symbol                                     | Parameter                            | Conditions                                                                                                                     | Min                    | Typ | Max                    | Unit |
|--------------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------|-----|------------------------|------|
| <b>T<sub>amb</sub> = -40 °C to +125 °C</b> |                                      |                                                                                                                                |                        |     |                        |      |
| V <sub>IH</sub>                            | HIGH-level input voltage             | V <sub>CC</sub> = 0.8 V                                                                                                        | 0.75 × V <sub>CC</sub> | -   | -                      | V    |
|                                            |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V                                                                                              | 0.70 × V <sub>CC</sub> | -   | -                      | V    |
|                                            |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V                                                                                               | 1.6                    | -   | -                      | V    |
|                                            |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V                                                                                               | 2.0                    | -   | -                      | V    |
| V <sub>IL</sub>                            | LOW-level input voltage              | V <sub>CC</sub> = 0.8 V                                                                                                        | -                      | -   | 0.25 × V <sub>CC</sub> | V    |
|                                            |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V                                                                                              | -                      | -   | 0.30 × V <sub>CC</sub> | V    |
|                                            |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V                                                                                               | -                      | -   | 0.7                    | V    |
|                                            |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V                                                                                               | -                      | -   | 0.9                    | V    |
| V <sub>OH</sub>                            | HIGH-level output voltage            | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                            |                        |     |                        |      |
|                                            |                                      | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V                                                                      | V <sub>CC</sub> - 0.11 | -   | -                      | V    |
|                                            |                                      | I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V                                                                              | 0.6 × V <sub>CC</sub>  | -   | -                      | V    |
|                                            |                                      | I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V                                                                              | 0.93                   | -   | -                      | V    |
|                                            |                                      | I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V                                                                             | 1.17                   | -   | -                      | V    |
|                                            |                                      | I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V                                                                              | 1.77                   | -   | -                      | V    |
|                                            |                                      | I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V                                                                              | 1.67                   | -   | -                      | V    |
|                                            |                                      | I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V                                                                              | 2.40                   | -   | -                      | V    |
|                                            |                                      | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V                                                                              | 2.30                   | -   | -                      | V    |
| V <sub>OL</sub>                            | LOW-level output voltage             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                            |                        |     |                        |      |
|                                            |                                      | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V                                                                       | -                      | -   | 0.11                   | V    |
|                                            |                                      | I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V                                                                               | -                      | -   | 0.33 × V <sub>CC</sub> | V    |
|                                            |                                      | I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V                                                                               | -                      | -   | 0.41                   | V    |
|                                            |                                      | I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V                                                                              | -                      | -   | 0.39                   | V    |
|                                            |                                      | I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V                                                                               | -                      | -   | 0.36                   | V    |
|                                            |                                      | I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V                                                                               | -                      | -   | 0.50                   | V    |
|                                            |                                      | I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V                                                                               | -                      | -   | 0.36                   | V    |
|                                            |                                      | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V                                                                               | -                      | -   | 0.50                   | V    |
| I <sub>I</sub>                             | input leakage current                | V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V                                                                  | -                      | -   | ±0.75                  | µA   |
| I <sub>OZ</sub>                            | OFF-state output current             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = 0 V to 3.6 V;<br>V <sub>CC</sub> = 0 V to 3.6 V         | -                      | -   | ±0.75                  | µA   |
| I <sub>OFF</sub>                           | power-off leakage current            | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V                                                         | -                      | -   | ±0.75                  | µA   |
| ΔI <sub>OFF</sub>                          | additional power-off leakage current | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V;<br>V <sub>CC</sub> = 0 V to 0.2 V                                             | -                      | -   | ±0.75                  | µA   |
| I <sub>CC</sub>                            | supply current                       | V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 0.8 V to 3.6 V                            | -                      | -   | 1.4                    | µA   |
| ΔI <sub>CC</sub>                           | additional supply current            | data input; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; [1]<br>V <sub>CC</sub> = 3.3 V                     | -                      | -   | 75                     | µA   |
|                                            |                                      | n $\overline{\text{OE}}$ input; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; [1]<br>V <sub>CC</sub> = 3.3 V | -                      | -   | 180                    | µA   |
|                                            |                                      | all inputs; V <sub>I</sub> = GND to 3.6 V;<br>n $\overline{\text{OE}}$ = GND; V <sub>CC</sub> = 0.8 V to 3.6 V [2]             | -                      | -   | 1                      | µA   |

[1] One input at V<sub>CC</sub> - 0.6 V, other input at V<sub>CC</sub> or GND.

[2] To show I<sub>CC</sub> remains very low when the input-disable feature is enabled.

11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 6.

| Symbol                | Parameter         | Conditions                         | 25 °C |        |      | T <sub>amb</sub> =<br>-40 °C to +85 °C |      | T <sub>amb</sub> =<br>-40 °C to +125 °C |      | Unit |
|-----------------------|-------------------|------------------------------------|-------|--------|------|----------------------------------------|------|-----------------------------------------|------|------|
|                       |                   |                                    | Min   | Typ[1] | Max  | Min                                    | Max  | Min                                     | Max  |      |
| C <sub>L</sub> = 5 pF |                   |                                    |       |        |      |                                        |      |                                         |      |      |
| t <sub>pd</sub>       | propagation delay | nA to nY; see Fig. 4. [2]          |       |        |      |                                        |      |                                         |      |      |
|                       |                   | V <sub>CC</sub> = 0.8 V            | -     | 20.6   | -    | -                                      | -    | -                                       | -    | ns   |
|                       |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 2.8   | 5.5    | 10.5 | 2.5                                    | 11.7 | 2.5                                     | 12.9 | ns   |
|                       |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.2   | 3.9    | 6.1  | 2.0                                    | 7.3  | 2.0                                     | 8.1  | ns   |
|                       |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 1.9   | 3.2    | 4.8  | 1.7                                    | 6.1  | 1.7                                     | 6.7  | ns   |
|                       |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.6   | 2.6    | 3.6  | 1.4                                    | 4.3  | 1.4                                     | 4.9  | ns   |
|                       |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.4   | 2.4    | 3.1  | 1.2                                    | 3.9  | 1.2                                     | 4.4  | ns   |
| t <sub>en</sub>       | enable time       | nOE to nY; see Fig. 5. [3]         |       |        |      |                                        |      |                                         |      |      |
|                       |                   | V <sub>CC</sub> = 0.8 V            | -     | 69.9   | -    | -                                      | -    | -                                       | -    | ns   |
|                       |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 3.1   | 6.1    | 11.8 | 2.9                                    | 13.9 | 2.9                                     | 15.4 | ns   |
|                       |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.5   | 4.2    | 6.6  | 2.3                                    | 7.7  | 2.3                                     | 8.3  | ns   |
|                       |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.1   | 3.4    | 5.1  | 2.0                                    | 6.2  | 2.0                                     | 6.8  | ns   |
|                       |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.8   | 2.6    | 3.7  | 1.7                                    | 4.5  | 1.7                                     | 5.0  | ns   |
|                       |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.7   | 2.4    | 3.1  | 1.7                                    | 3.5  | 1.7                                     | 3.9  | ns   |
| t <sub>dis</sub>      | disable time      | nOE to nY; see Fig. 5. [4]         |       |        |      |                                        |      |                                         |      |      |
|                       |                   | V <sub>CC</sub> = 0.8 V            | -     | 14.3   | -    | -                                      | -    | -                                       | -    | ns   |
|                       |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 2.7   | 4.3    | 6.5  | 2.7                                    | 7.3  | 2.7                                     | 8.2  | ns   |
|                       |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.1   | 3.2    | 4.4  | 2.1                                    | 5.1  | 2.1                                     | 5.7  | ns   |
|                       |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.0   | 3.0    | 4.3  | 2.0                                    | 5.0  | 2.0                                     | 5.7  | ns   |
|                       |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.4   | 2.2    | 2.9  | 1.4                                    | 3.3  | 1.4                                     | 4.1  | ns   |
|                       |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.7   | 2.5    | 3.2  | 1.7                                    | 3.4  | 1.7                                     | 3.9  | ns   |

| Symbol                 | Parameter         | Conditions                         | 25 °C |        |      | T <sub>amb</sub> =<br>-40 °C to +85 °C |      | T <sub>amb</sub> =<br>-40 °C to +125 °C |      | Unit |
|------------------------|-------------------|------------------------------------|-------|--------|------|----------------------------------------|------|-----------------------------------------|------|------|
|                        |                   |                                    | Min   | Typ[1] | Max  | Min                                    | Max  | Min                                     | Max  |      |
| C <sub>L</sub> = 10 pF |                   |                                    |       |        |      |                                        |      |                                         |      |      |
| t <sub>pd</sub>        | propagation delay | nA to nY; see Fig. 4. [2]          |       |        |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V            | -     | 24.0   | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 3.2   | 6.4    | 12.3 | 3.0                                    | 13.8 | 3.0                                     | 15.2 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.1   | 4.5    | 7.3  | 1.9                                    | 8.5  | 1.9                                     | 9.4  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 1.9   | 3.8    | 5.5  | 1.7                                    | 6.8  | 1.7                                     | 7.6  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.1   | 3.2    | 4.2  | 1.6                                    | 5.3  | 1.6                                     | 5.9  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.8   | 3.0    | 3.8  | 1.6                                    | 4.6  | 1.6                                     | 5.2  | ns   |
| t <sub>en</sub>        | enable time       | nOE to nY; see Fig. 5. [3]         |       |        |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V            | -     | 73.7   | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 3.6   | 6.9    | 13.5 | 3.4                                    | 15.8 | 3.4                                     | 17.5 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.3   | 4.8    | 7.7  | 2.2                                    | 8.6  | 2.2                                     | 9.4  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.0   | 3.9    | 5.8  | 1.9                                    | 6.8  | 1.9                                     | 7.4  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.8   | 3.2    | 4.3  | 1.7                                    | 5.3  | 1.7                                     | 5.9  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.7   | 3.0    | 3.9  | 1.7                                    | 4.3  | 1.7                                     | 4.8  | ns   |
| t <sub>dis</sub>       | disable time      | nOE to nY; see Fig. 5. [4]         |       |        |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V            | -     | 32.7   | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 3.4   | 5.4    | 7.9  | 3.4                                    | 8.8  | 3.4                                     | 9.9  | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.2   | 4.1    | 5.5  | 2.2                                    | 6.2  | 2.2                                     | 7.1  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.2   | 4.2    | 5.6  | 1.9                                    | 6.3  | 1.9                                     | 7.1  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.7   | 3.0    | 3.8  | 1.7                                    | 4.5  | 1.7                                     | 5.1  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.1   | 3.8    | 4.8  | 1.7                                    | 5.0  | 1.7                                     | 5.6  | ns   |

| Symbol                 | Parameter         | Conditions                         | 25 °C |        |      | T <sub>amb</sub> =<br>-40 °C to +85 °C |      | T <sub>amb</sub> =<br>-40 °C to +125 °C |      | Unit |
|------------------------|-------------------|------------------------------------|-------|--------|------|----------------------------------------|------|-----------------------------------------|------|------|
|                        |                   |                                    | Min   | Typ[1] | Max  | Min                                    | Max  | Min                                     | Max  |      |
| C <sub>L</sub> = 15 pF |                   |                                    |       |        |      |                                        |      |                                         |      |      |
| t <sub>pd</sub>        | propagation delay | nA to nY; see Fig. 4. [2]          |       |        |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V            | -     | 27.4   | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 3.6   | 7.2    | 14.1 | 3.3                                    | 15.8 | 3.3                                     | 17.5 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 3.0   | 5.1    | 8.1  | 2.5                                    | 9.8  | 2.5                                     | 10.9 | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.2   | 4.3    | 6.3  | 2.0                                    | 7.9  | 2.0                                     | 8.8  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.0   | 3.7    | 4.9  | 1.8                                    | 6.0  | 1.8                                     | 6.7  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.0   | 3.5    | 4.4  | 1.8                                    | 5.4  | 1.8                                     | 6.1  | ns   |
| t <sub>en</sub>        | enable time       | nOE to nY; see Fig. 5. [3]         |       |        |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V            | -     | 77.5   | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 4.0   | 7.7    | 15.2 | 3.7                                    | 17.6 | 3.7                                     | 19.6 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 3.0   | 5.3    | 8.4  | 2.5                                    | 9.8  | 2.5                                     | 10.7 | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.3   | 4.4    | 6.5  | 2.1                                    | 7.7  | 2.1                                     | 8.5  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.1   | 3.6    | 5.0  | 2.0                                    | 6.1  | 2.0                                     | 6.8  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.0   | 3.5    | 4.4  | 1.9                                    | 4.9  | 1.9                                     | 5.5  | ns   |
| t <sub>dis</sub>       | disable time      | nOE to nY; see Fig. 5. [4]         |       |        |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V            | -     | 60.8   | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 4.3   | 6.5    | 9.2  | 3.7                                    | 10.3 | 3.7                                     | 11.6 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 3.0   | 5.0    | 6.5  | 2.5                                    | 7.4  | 2.5                                     | 8.4  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 3.0   | 5.3    | 7.0  | 2.1                                    | 7.4  | 2.1                                     | 8.9  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.1   | 3.8    | 4.9  | 2.0                                    | 5.1  | 2.0                                     | 6.4  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.9   | 5.0    | 6.2  | 1.9                                    | 6.6  | 1.9                                     | 7.4  | ns   |

| Symbol                                        | Parameter                     | Conditions                                                                             | 25 °C |        |      | T <sub>amb</sub> =<br>-40 °C to +85 °C |      | T <sub>amb</sub> =<br>-40 °C to +125 °C |      | Unit |
|-----------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------|-------|--------|------|----------------------------------------|------|-----------------------------------------|------|------|
|                                               |                               |                                                                                        | Min   | Typ[1] | Max  | Min                                    | Max  | Min                                     | Max  |      |
| C <sub>L</sub> = 30 pF                        |                               |                                                                                        |       |        |      |                                        |      |                                         |      |      |
| t <sub>pd</sub>                               | propagation delay             | nA to nY; see Fig. 4. [2]                                                              |       |        |      |                                        |      |                                         |      |      |
|                                               |                               | V <sub>CC</sub> = 0.8 V                                                                | -     | 37.4   | -    | -                                      | -    | -                                       | -    | ns   |
|                                               |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                                                       | 4.8   | 9.5    | 19.0 | 4.4                                    | 21.6 | 4.4                                     | 24.0 | ns   |
|                                               |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                                                       | 4.0   | 6.7    | 10.8 | 3.0                                    | 13.0 | 3.0                                     | 14.5 | ns   |
|                                               |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                                     | 2.9   | 5.6    | 8.4  | 2.6                                    | 10.3 | 2.6                                     | 11.5 | ns   |
|                                               |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                                       | 2.7   | 4.8    | 6.3  | 2.5                                    | 7.8  | 2.5                                     | 8.7  | ns   |
|                                               |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                       | 2.7   | 4.6    | 5.8  | 2.5                                    | 7.5  | 2.5                                     | 8.3  | ns   |
| t <sub>en</sub>                               | enable time                   | nOE to nY; see Fig. 5. [3]                                                             |       |        |      |                                        |      |                                         |      |      |
|                                               |                               | V <sub>CC</sub> = 0.8 V                                                                | -     | 88.9   | -    | -                                      | -    | -                                       | -    | ns   |
|                                               |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                                                       | 5.2   | 9.9    | 19.8 | 4.8                                    | 22.8 | 4.8                                     | 25.3 | ns   |
|                                               |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                                                       | 4.0   | 6.8    | 10.8 | 3.1                                    | 12.6 | 3.1                                     | 14.1 | ns   |
|                                               |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                                     | 3.0   | 5.6    | 8.5  | 2.8                                    | 10.2 | 2.8                                     | 11.3 | ns   |
|                                               |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                                       | 2.7   | 4.8    | 6.5  | 2.6                                    | 7.8  | 2.6                                     | 8.8  | ns   |
|                                               |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                       | 2.7   | 4.6    | 6.0  | 2.6                                    | 6.9  | 2.6                                     | 7.7  | ns   |
| t <sub>dis</sub>                              | disable time                  | nOE to nY; see Fig. 5. [4]                                                             |       |        |      |                                        |      |                                         |      |      |
|                                               |                               | V <sub>CC</sub> = 0.8 V                                                                | -     | 49.9   | -    | -                                      | -    | -                                       | -    | ns   |
|                                               |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                                                       | 6.0   | 9.9    | 13.3 | 4.8                                    | 14.8 | 4.8                                     | 16.5 | ns   |
|                                               |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                                                       | 4.4   | 7.7    | 9.6  | 3.1                                    | 10.8 | 3.1                                     | 12.1 | ns   |
|                                               |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                                     | 5.1   | 8.7    | 11.1 | 2.8                                    | 12.4 | 2.8                                     | 13.8 | ns   |
|                                               |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                                       | 3.6   | 6.2    | 7.6  | 2.6                                    | 8.6  | 2.6                                     | 9.6  | ns   |
|                                               |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                       | 5.2   | 8.7    | 10.5 | 2.6                                    | 10.8 | 2.6                                     | 13.1 | ns   |
| C <sub>L</sub> = 5 pF, 10 pF, 15 pF and 30 pF |                               |                                                                                        |       |        |      |                                        |      |                                         |      |      |
| C <sub>PD</sub>                               | power dissipation capacitance | output enabled; f <sub>i</sub> = 1 MHz; [5]<br>V <sub>I</sub> = GND to V <sub>CC</sub> |       |        |      |                                        |      |                                         |      |      |
|                                               |                               | V <sub>CC</sub> = 0.8 V                                                                | -     | 2.7    | -    | -                                      | -    | -                                       | -    | pF   |
|                                               |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                                                       | -     | 2.8    | -    | -                                      | -    | -                                       | -    | pF   |
|                                               |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                                                       | -     | 2.9    | -    | -                                      | -    | -                                       | -    | pF   |
|                                               |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                                     | -     | 3.0    | -    | -                                      | -    | -                                       | -    | pF   |
|                                               |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                                       | -     | 3.6    | -    | -                                      | -    | -                                       | -    | pF   |
|                                               |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                       | -     | 4.2    | -    | -                                      | -    | -                                       | -    | pF   |

[1] All typical values are measured at nominal V<sub>CC</sub>.

[2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

[3] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.

[4] t<sub>dis</sub> is the same as t<sub>PHZ</sub> and t<sub>PLZ</sub>.

[5] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

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

f<sub>i</sub> = input frequency in MHz;

f<sub>o</sub> = output frequency in MHz;

C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

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

11.1. Waveforms and test circuit

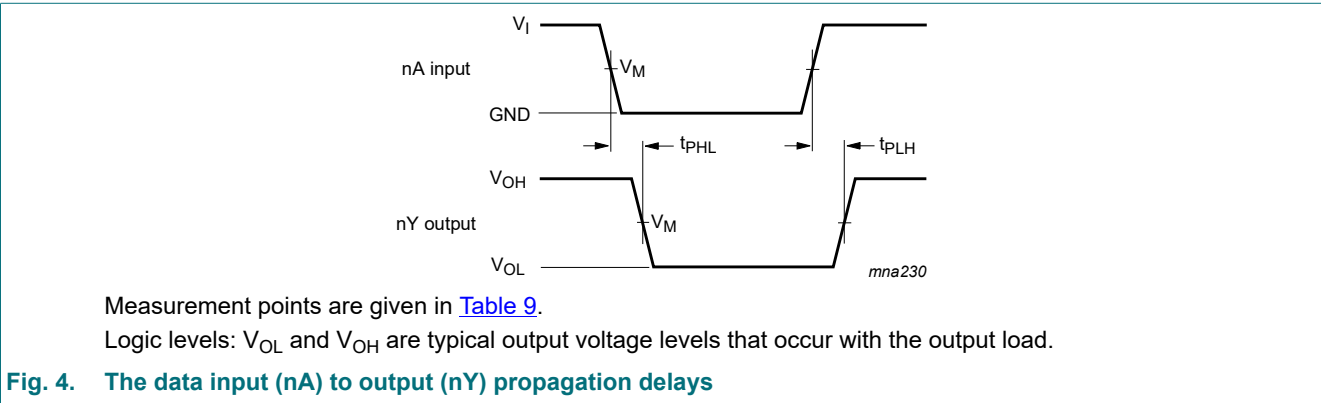


Table 9. Measurement points

| Supply voltage | Input               |          |               | Output              |
|----------------|---------------------|----------|---------------|---------------------|
| $V_{CC}$       | $V_M$               | $V_I$    | $t_r = t_f$   | $V_M$               |
| 0.8 V to 3.6 V | $0.5 \times V_{CC}$ | $V_{CC}$ | $\leq 3.0$ ns | $0.5 \times V_{CC}$ |

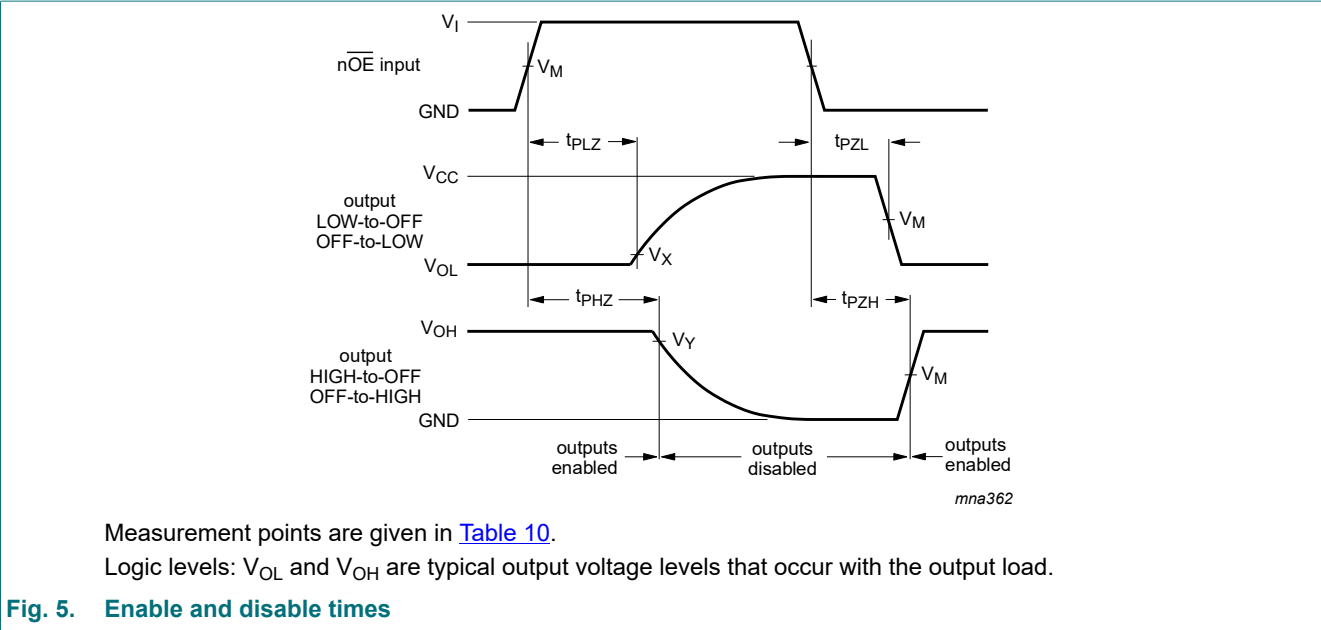
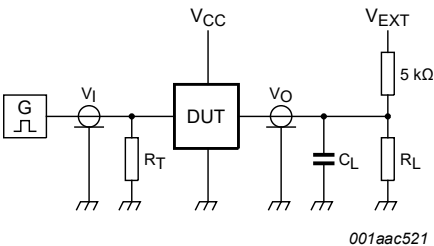


Table 10. Measurement points

| Supply voltage  | Input               | Output              |                   |                   |
|-----------------|---------------------|---------------------|-------------------|-------------------|
| $V_{CC}$        | $V_M$               | $V_M$               | $V_X$             | $V_Y$             |
| 0.8 V to 1.6 V  | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.1$ V  | $V_{OH} - 0.1$ V  |
| 1.65 V to 2.7 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15$ V | $V_{OH} - 0.15$ V |
| 3.0 V to 3.6 V  | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.3$ V  | $V_{OH} - 0.3$ V  |



Test data is given in [Table 11](#).  
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 the output impedance  $Z_O$  of the pulse generator;  
 $V_{EXT}$  = External voltage for measuring switching times.

Fig. 6. Test circuit for measuring switching times

Table 11. Test data

| Supply voltage  | Load                         |                    | V <sub>EXT</sub>                    |                                     |                                     |
|-----------------|------------------------------|--------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| V <sub>CC</sub> | C <sub>L</sub>               | R <sub>L</sub> [1] | t <sub>PLH</sub> , t <sub>PHL</sub> | t <sub>PZH</sub> , t <sub>PHZ</sub> | t <sub>PZL</sub> , t <sub>PLZ</sub> |
| 0.8 V to 3.6 V  | 5 pF, 10 pF, 15 pF and 30 pF | 5 kΩ or 1 MΩ       | open                                | GND                                 | 2 × V <sub>CC</sub>                 |

[1] For measuring enable and disable times  $R_L = 5\text{ k}\Omega$ .  
For measuring propagation delays, setup and hold times and pulse width  $R_L = 1\text{ M}\Omega$ .

12. Package outline

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm SOT765-1

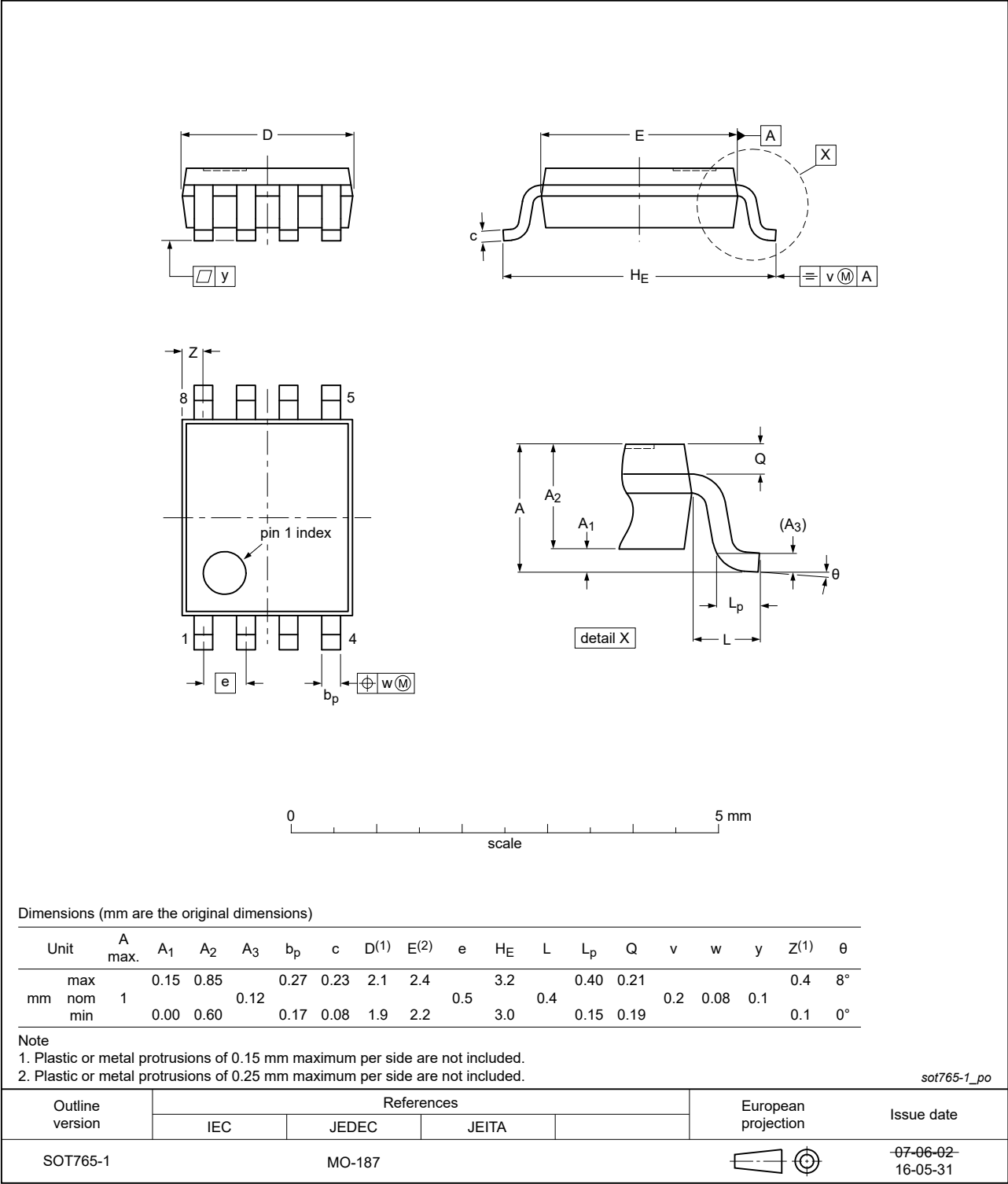


Fig. 7. Package outline SOT765-1 (VSSOP8)

XSON8: plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm

SOT833-1

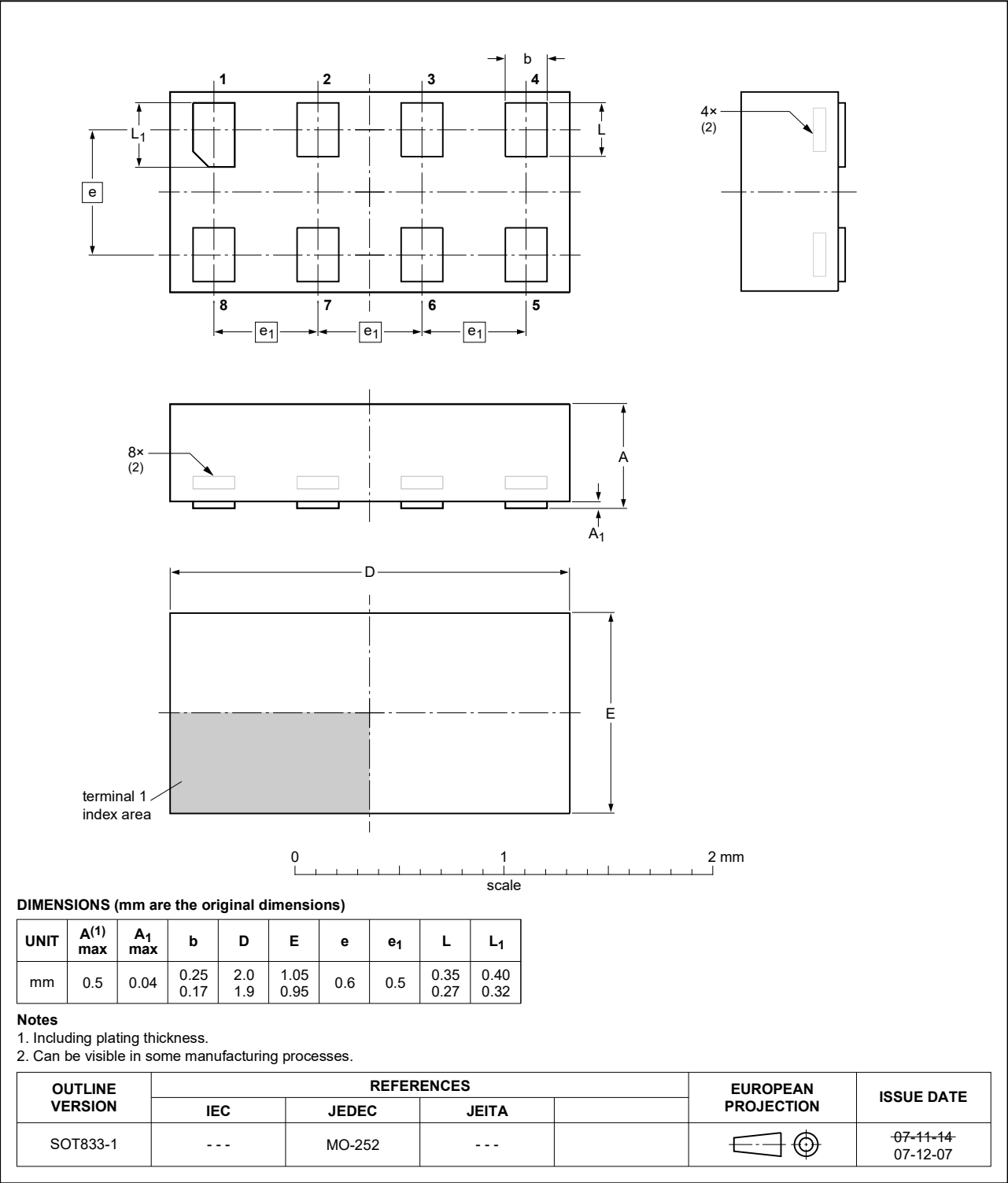


Fig. 8. Package outline SOT833-1 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.2 x 1.0 x 0.35 mm

SOT1116

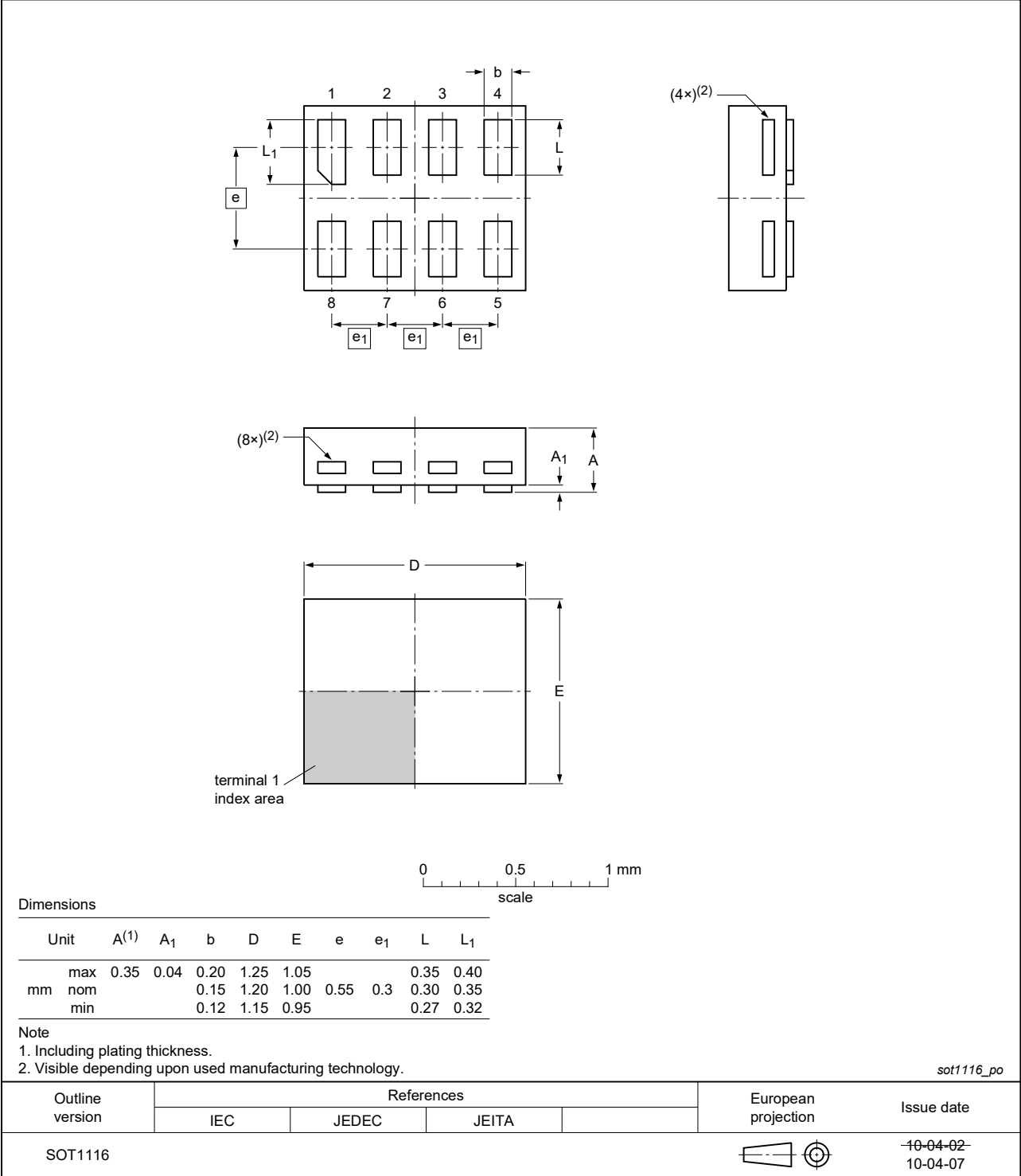


Fig. 9. Package outline SOT1116 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1.0 x 0.35 mm

SOT1203

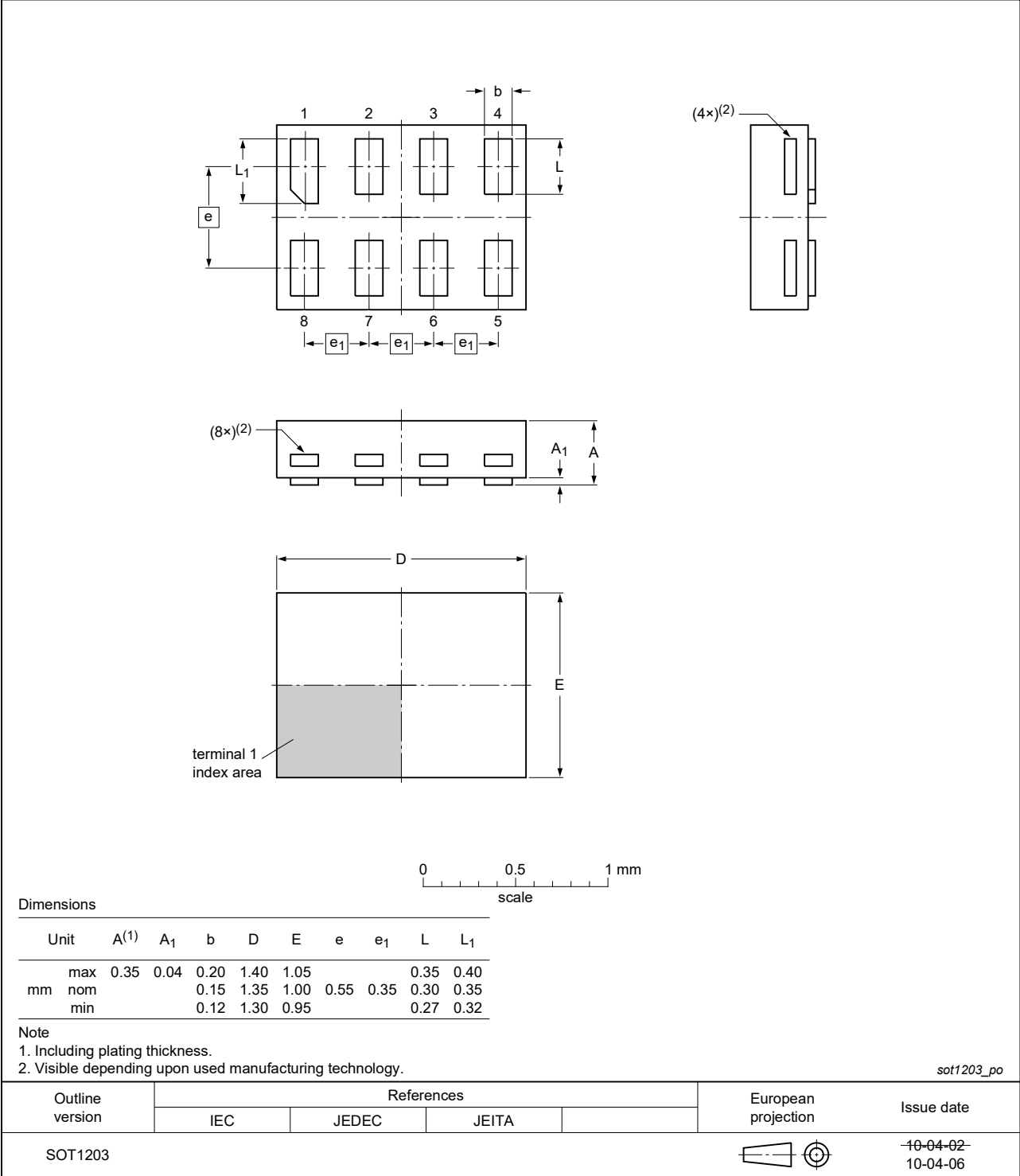


Fig. 10. Package outline SOT1203 (XSON8)

**X2SON8: plastic thermal enhanced extremely thin small outline package; no leads;**  
**8 terminals; body 1.35 x 0.8 x 0.32 mm**

SOT1233-2

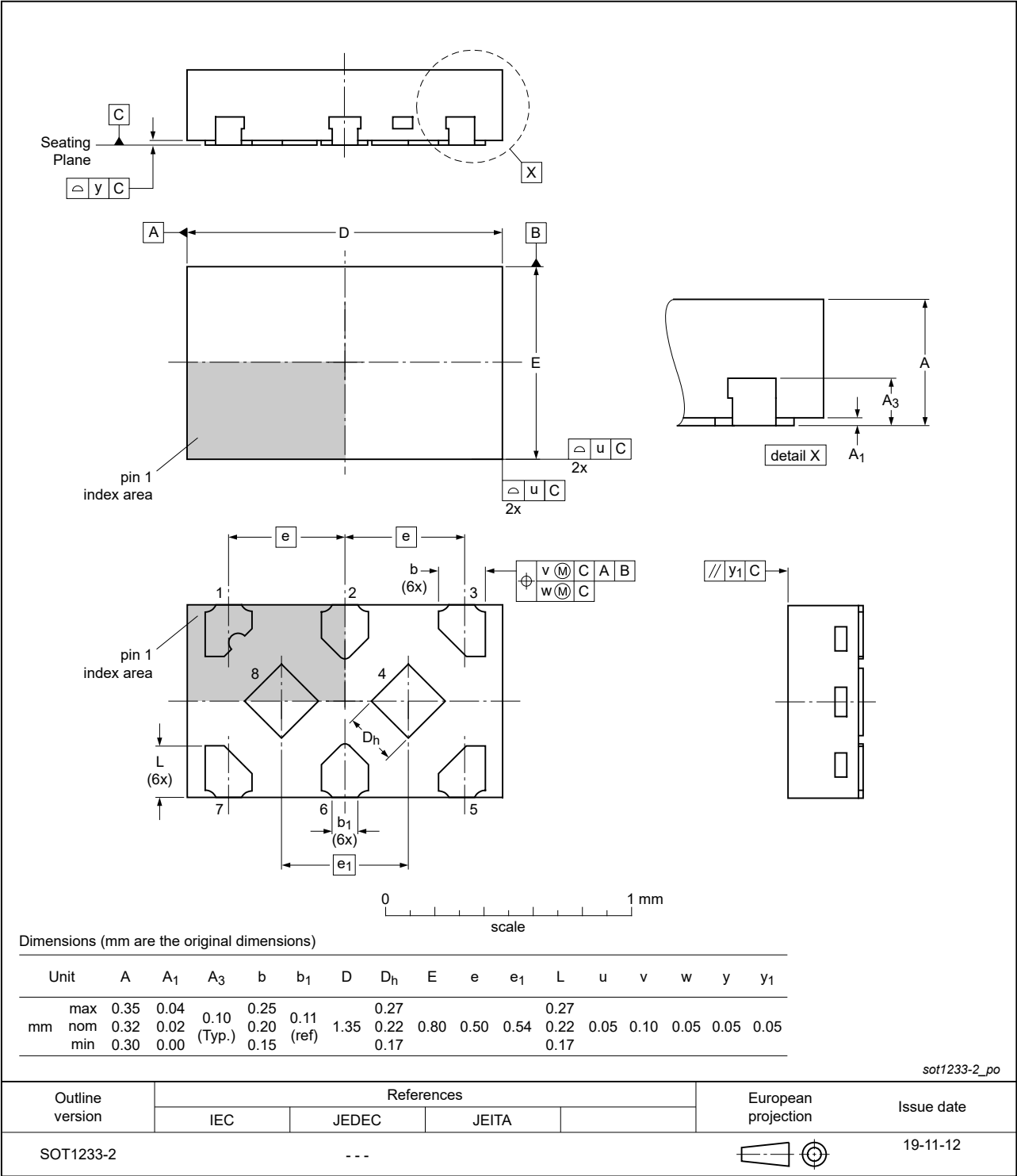


Fig. 11. Package outline SOT1233-2 (X2SON8)

13. Abbreviations

Table 12. Abbreviations

| Acronym | Description                               |
|---------|-------------------------------------------|
| ANSI    | American National Standards Institute     |
| CDM     | Charged Device Model                      |
| DUT     | Device Under Test                         |
| ESD     | ElectroStatic Discharge                   |
| ESDA    | ElectroStatic Discharge Association       |
| HBM     | Human Body Model                          |
| JEDEC   | Joint Electron Device Engineering Council |

14. Revision history

Table 13. Revision history

| Document ID     | Release date                                                                                                                                                                                                                                                                                                                | Data sheet status  | Change notice | Supersedes      |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|-----------------|
| 74AUP2G125 v.16 | 20240812                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.15 |
| Modifications:  | • Type number 74AUP2G125GF (SOT1089/XSON8) removed.                                                                                                                                                                                                                                                                         |                    |               |                 |
| 74AUP2G125 v.15 | 20230726                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.14 |
| Modifications:  | • <a href="#">Section 2</a> : ESD specification updated according to the latest JEDEC standard.                                                                                                                                                                                                                             |                    |               |                 |
| 74AUP2G125 v.14 | 20220621                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.13 |
| Modifications:  | • Package SOT1233 (X2SON8) changed to SOT1233-2 (X2SON8).                                                                                                                                                                                                                                                                   |                    |               |                 |
| 74AUP2G125 v.13 | 20220310                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.12 |
| Modifications:  | • Type number 74AUP2G125GM (SOT902-2/XQFN8) removed.<br>• <a href="#">Section 1</a> and <a href="#">Section 2</a> updated.<br>• <a href="#">Table 5</a> : Derating values for P <sub>tot</sub> total power dissipation have been updated.                                                                                   |                    |               |                 |
| 74AUP2G125 v.12 | 20170703                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.11 |
| Modifications:  | • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• <a href="#">Section 6.1</a> and <a href="#">Fig. 11</a> (drawings SOT1233/X2SON8) updated<br>• Type number 74AUP2G125GD removed. |                    |               |                 |
| 74AUP2G125 v.11 | 20161028                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.10 |
| Modifications:  | • Added type number 74AUP2G125GX (SOT1233/X2SON8)                                                                                                                                                                                                                                                                           |                    |               |                 |
| 74AUP2G125 v.10 | 20130208                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.9  |
| Modifications:  | • For type number 74AUP2G125GD XSON8U has changed to XSON8.                                                                                                                                                                                                                                                                 |                    |               |                 |
| 74AUP2G125 v.9  | 20120607                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.8  |
| 74AUP2G125 v.8  | 20111202                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.7  |
| 74AUP2G125 v.7  | 20100921                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.6  |
| 74AUP2G125 v.6  | 20091127                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.5  |
| 74AUP2G125 v.5  | 20090202                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.4  |
| 74AUP2G125 v.4  | 20090122                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.3  |
| 74AUP2G125 v.3  | 20080409                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.2  |
| 74AUP2G125 v.2  | 20070419                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G125 v.1  |
| 74AUP2G125 v.1  | 20061017                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | -               |

## 15. Legal information

### Data sheet status

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

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Ordering information.....2

4. Marking.....2

5. Functional diagram.....2

6. Pinning information.....3

6.1. Pinning.....3

6.2. Pin description..... 3

7. Functional description..... 4

8. Limiting values..... 4

9. Recommended operating conditions.....4

10. Static characteristics.....5

11. Dynamic characteristics.....8

11.1. Waveforms and test circuit..... 12

12. Package outline..... 14

13. Abbreviations..... 19

14. Revision history.....19

15. Legal information.....20

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