

# 74AUP1G16

Low-power buffer

Rev. 5 — 17 July 2023

Product data sheet

## 1. General description

The 74AUP1G16 provides a low-power, low-voltage single buffer.

Schmitt trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire  $V_{CC}$  range from 0.8 V to 3.6 V.

This device ensures a 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 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
- 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)
- Low static power consumption;  $I_{CC} = 0.9 \mu\text{A}$  (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot  $< 10\%$  of  $V_{CC}$
- $I_{OFF}$  circuitry provides partial power-down mode operation
- 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  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$

## 3. Ordering information

Table 1. Ordering information

| Type number                 | Package                                                         |        |                                                                                                         |                          |
|-----------------------------|-----------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------|--------------------------|
|                             | Temperature range                                               | Name   | Description                                                                                             | Version                  |
| <a href="#">74AUP1G16GW</a> | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm                                  | <a href="#">SOT353-1</a> |
| <a href="#">74AUP1G16GM</a> | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | XSON6  | plastic extremely thin small outline package; no leads; 6 terminals; body $1 \times 1.45 \times 0.5$ mm | <a href="#">SOT886</a>   |

## 4. Marking

Table 2. Marking

| Type number | Marking code [1] |
|-------------|------------------|
| 74AUP1G16GW | 5N               |
| 74AUP1G16GM | 5N               |

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

## 5. Functional diagram

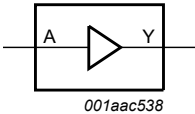


Fig. 1. Logic symbol

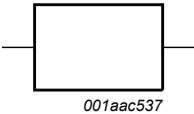


Fig. 2. IEC logic symbol

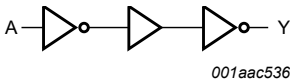
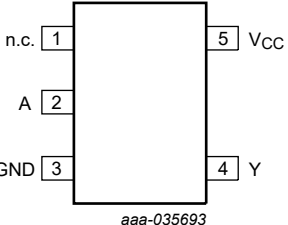


Fig. 3. Logic diagram

## 6. Pinning information

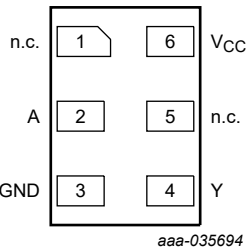
### 6.1. Pinning

**GW package  
SOT353-1 (TSSOP5)**



aaa-035693

**GM package  
SOT886 (XSON6)**



aaa-035694

Transparent top view

### 6.2. Pin description

Table 3. Pin description

| Symbol          | Pin    |       | Description    |
|-----------------|--------|-------|----------------|
|                 | TSSOP5 | XSON6 |                |
| n.c.            | 1      | 1     | not connected  |
| A               | 2      | 2     | data input     |
| GND             | 3      | 3     | ground (0 V)   |
| Y               | 4      | 4     | data output    |
| n.c.            | -      | 5     | not connected  |
| V <sub>CC</sub> | 5      | 6     | supply voltage |

## 7. Functional description

**Table 4. Function table**

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

| Input | Output |
|-------|--------|
| A     | Y      |
| L     | L      |
| H     | H      |

## 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 |
|-----------|-------------------------|---------------------------------|------|----------|------|
| $V_{CC}$  | supply voltage          |                                 | -0.5 | +4.6     | V    |
| $I_{IK}$  | input clamping current  | $V_I < 0$ V                     | -50  | -        | mA   |
| $V_I$     | input voltage           |                                 | -0.5 | +4.6     | V    |
| $I_{OK}$  | output clamping current | $V_O < 0$ V                     | -50  | -        | mA   |
| $V_O$     | output voltage          | Active mode and Power-down mode | -0.5 | +4.6     | V    |
| $I_O$     | output current          | $V_O = 0$ V to $V_{CC}$         | -    | $\pm 20$ | mA   |
| $I_{CC}$  | supply current          |                                 | -    | +50      | mA   |
| $I_{GND}$ | ground current          |                                 | -50  | -        | mA   |
| $T_{stg}$ | storage temperature     |                                 | -65  | +150     | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40$ °C to +125 °C   | -    | 250      | mW   |

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

[2] For SOT353-1 (TSSOP5) package:  $P_{tot}$  derates linearly with 3.3 mW/K above 74 °C.

For SOT886 (XSON6) package:  $P_{tot}$  derates linearly with 3.3 mW/K above 74 °C.

## 9. Recommended operating conditions

**Table 6. Recommended operating conditions**

| Symbol              | Parameter                           | Conditions                      | Min | Max      | Unit |
|---------------------|-------------------------------------|---------------------------------|-----|----------|------|
| $V_{CC}$            | supply voltage                      |                                 | 0.8 | 3.6      | V    |
| $V_I$               | input voltage                       |                                 | 0   | 3.6      | V    |
| $V_O$               | output voltage                      | Active mode                     | 0   | $V_{CC}$ | V    |
|                     |                                     | Power-down mode; $V_{CC} = 0$ V | 0   | 3.6      | V    |
| $T_{amb}$           | ambient temperature                 |                                 | -40 | +125     | °C   |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 0.8$ V to 3.6 V       | 0   | 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>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            | V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V [1]         | -                      | -   | 40                     | µA   |
| 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                   | V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V                                                         | -                      | 1.7 | -                      | pF   |

| Symbol                                    | Parameter                            | Conditions                                                                                          | Min                    | Typ | Max                    | Unit |
|-------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------|-----|------------------------|------|
| <b>T<sub>amb</sub> = -40 °C to +85 °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                                                   | 0.7 × 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>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            | V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V [1]         | -                      | -   | 50                     | 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>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            | V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V [1]         | -                      | -   | 75                     | µA   |

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

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 5.

| Symbol                 | Parameter         | Conditions                             | T <sub>amb</sub> = 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 | A to Y; see <a href="#">Fig. 4</a> [2] |                          |         |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V                | -                        | 15.0    | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V       | 2.6                      | 4.7     | 9.2  | 2.0                                    | 10.0 | 2.0                                     | 11.0 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V       | 2.1                      | 3.4     | 5.7  | 1.6                                    | 6.5  | 1.6                                     | 7.2  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V     | 1.8                      | 2.9     | 4.5  | 1.4                                    | 5.2  | 1.4                                     | 5.8  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V       | 1.5                      | 2.3     | 3.5  | 1.2                                    | 4.2  | 1.2                                     | 4.6  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V       | 1.4                      | 2.1     | 3.2  | 1.0                                    | 3.8  | 1.0                                     | 4.2  | ns   |
| C <sub>L</sub> = 10 pF |                   |                                        |                          |         |      |                                        |      |                                         |      |      |
| t <sub>pd</sub>        | propagation delay | A to Y; see <a href="#">Fig. 4</a> [2] |                          |         |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V                | -                        | 18.4    | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V       | 3.2                      | 5.6     | 10.9 | 2.3                                    | 11.8 | 2.3                                     | 13.1 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V       | 2.6                      | 4.1     | 6.7  | 1.9                                    | 7.7  | 1.9                                     | 8.5  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V     | 2.3                      | 3.4     | 5.3  | 1.7                                    | 6.2  | 1.7                                     | 6.9  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V       | 2.0                      | 2.9     | 4.2  | 1.5                                    | 5.0  | 1.5                                     | 5.5  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V       | 1.7                      | 2.6     | 3.8  | 1.4                                    | 4.6  | 1.4                                     | 5.1  | ns   |
| C <sub>L</sub> = 15 pF |                   |                                        |                          |         |      |                                        |      |                                         |      |      |
| t <sub>pd</sub>        | propagation delay | A to Y; see <a href="#">Fig. 4</a> [2] |                          |         |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V                | -                        | 21.9    | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V       | 3.6                      | 6.4     | 12.6 | 2.6                                    | 13.8 | 2.6                                     | 15.2 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V       | 3.0                      | 4.6     | 7.6  | 2.2                                    | 8.9  | 2.2                                     | 9.8  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V     | 2.6                      | 3.9     | 6.0  | 2.0                                    | 7.2  | 2.0                                     | 7.9  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V       | 2.3                      | 3.3     | 4.8  | 1.8                                    | 5.7  | 1.8                                     | 6.3  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V       | 2.1                      | 3.1     | 4.2  | 1.6                                    | 5.0  | 1.6                                     | 5.5  | ns   |
| C <sub>L</sub> = 30 pF |                   |                                        |                          |         |      |                                        |      |                                         |      |      |
| t <sub>pd</sub>        | propagation delay | A to Y; see <a href="#">Fig. 4</a> [2] |                          |         |      |                                        |      |                                         |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V                | -                        | 32.1    | -    | -                                      | -    | -                                       | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V       | 4.8                      | 8.7     | 16.3 | 3.6                                    | 18.9 | 3.6                                     | 20.8 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V       | 4.0                      | 6.2     | 10.3 | 3.4                                    | 12.2 | 3.4                                     | 13.4 | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V     | 3.6                      | 5.2     | 8.1  | 3.2                                    | 9.8  | 3.2                                     | 10.8 | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V       | 3.0                      | 4.4     | 6.4  | 2.7                                    | 7.7  | 2.7                                     | 8.5  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V       | 2.9                      | 4.2     | 5.6  | 2.5                                    | 6.5  | 2.5                                     | 7.2  | ns   |

| Symbol          | Parameter                     | Conditions                                                          | T <sub>amb</sub> = 25 °C |         |     | T <sub>amb</sub> = -40 °C to +85 °C |     | T <sub>amb</sub> = -40 °C to +125 °C |     | Unit |
|-----------------|-------------------------------|---------------------------------------------------------------------|--------------------------|---------|-----|-------------------------------------|-----|--------------------------------------|-----|------|
|                 |                               |                                                                     | Min                      | Typ [1] | Max | Min                                 | Max | Min                                  | Max |      |
| C <sub>PD</sub> | power dissipation capacitance | f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [3] |                          |         |     |                                     |     |                                      |     |      |
|                 |                               | V <sub>CC</sub> = 0.8 V                                             | -                        | 2.5     | -   | -                                   | -   | -                                    | -   | pF   |
|                 |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                                    | -                        | 2.6     | -   | -                                   | -   | -                                    | -   | pF   |
|                 |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                                    | -                        | 2.7     | -   | -                                   | -   | -                                    | -   | pF   |
|                 |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                  | -                        | 2.9     | -   | -                                   | -   | -                                    | -   | pF   |
|                 |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                    | -                        | 3.4     | -   | -                                   | -   | -                                    | -   | pF   |
|                 |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                    | -                        | 4.0     | -   | -                                   | -   | -                                    | -   | 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] 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;
 Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of outputs.

11.1. Waveforms and test circuit

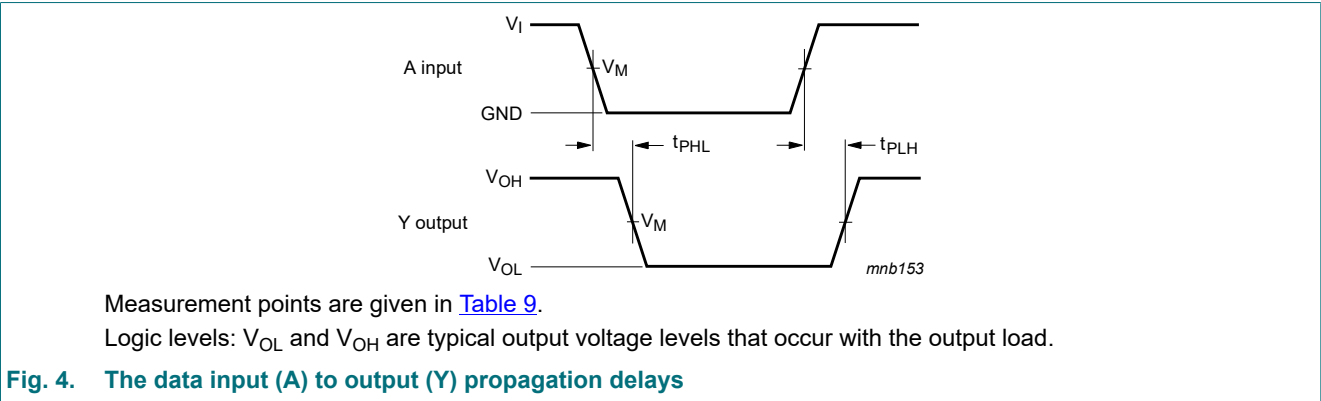
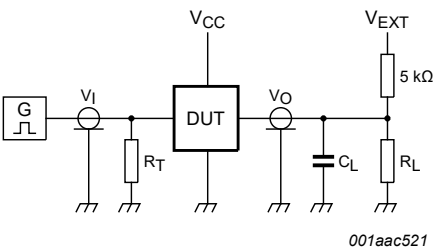


Table 9. Measurement points

| Supply voltage  | Input                 |                 |                                 | Output                |
|-----------------|-----------------------|-----------------|---------------------------------|-----------------------|
| V <sub>CC</sub> | V <sub>M</sub>        | V <sub>I</sub>  | t <sub>r</sub> = t <sub>f</sub> | V <sub>M</sub>        |
| 0.8 V to 3.6 V  | 0.5 × V <sub>CC</sub> | V <sub>CC</sub> | ≤ 3.0 ns                        | 0.5 × V <sub>CC</sub> |



Test data is given in [Table 10](#).  
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. 5. Test circuit for measuring switching times

Table 10. Test data

| Supply voltage | Load                         |              | $V_{EXT}$             |                       |                       |
|----------------|------------------------------|--------------|-----------------------|-----------------------|-----------------------|
| $V_{CC}$       | $C_L$                        | $R_L$ [1]    | $t_{PLH}$ , $t_{PHL}$ | $t_{PZH}$ , $t_{PHZ}$ | $t_{PZL}$ , $t_{PLZ}$ |
| 0.8 V to 3.6 V | 5 pF, 10 pF, 15 pF and 30 pF | 5 kΩ or 1 MΩ | open                  | GND                   | $2 \times V_{CC}$     |

[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

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm

SOT353-1

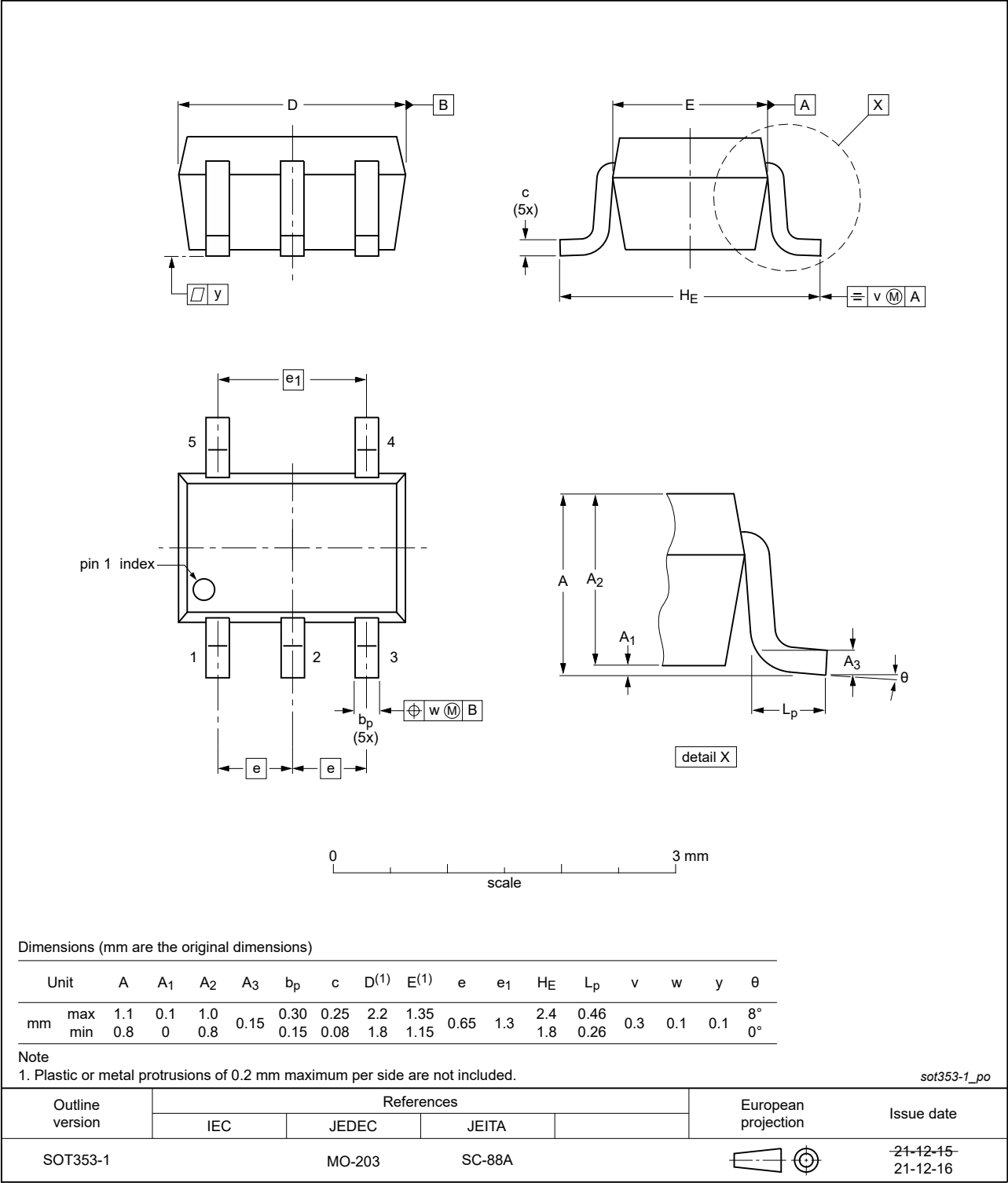


Fig. 6. Package outline SOT353-1 (TSSOP5)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm

SOT886

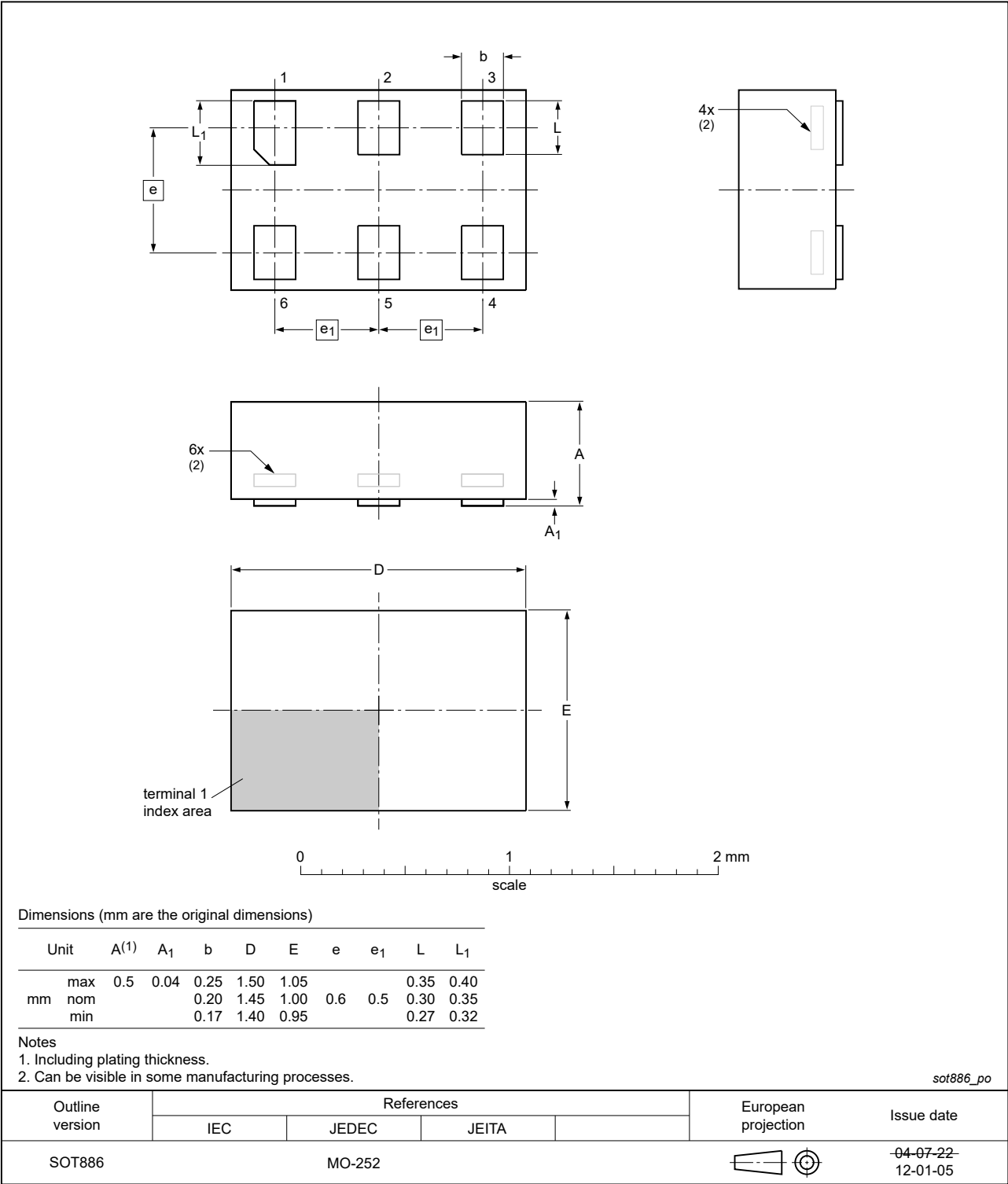


Fig. 7. Package outline SOT886 (XSON6)

## 13. Abbreviations

Table 11. Abbreviations

| Acronym | Description             |
|---------|-------------------------|
| CDM     | Charged Device Model    |
| DUT     | Device Under Test       |
| ESD     | ElectroStatic Discharge |
| HBM     | Human Body Model        |

## 14. Revision history

Table 12. Revision history

| Document ID    | Release date                                                                                                                                                                                                                                                                                                                                                                                                     | Data sheet status  | Change notice | Supersedes    |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|---------------|
| 74AUP1G16 v.5  | 20230717                                                                                                                                                                                                                                                                                                                                                                                                         | Product data sheet | -             | 74AUP1G16 v.4 |
| Modifications: | <ul style="list-style-type: none"> <li><a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li> </ul>                                                                                                                                                                                                                                                                   |                    |               |               |
| 74AUP1G16 v.4  | 20220118                                                                                                                                                                                                                                                                                                                                                                                                         | Product data sheet | -             | 74AUP1G16 v.3 |
| Modifications: | <ul style="list-style-type: none"> <li><a href="#">Fig. 6</a>: Package outline drawing for SOT353-1 (TSSOP5) has changed.</li> </ul>                                                                                                                                                                                                                                                                             |                    |               |               |
| 74AUP1G16 v.3  | 20201027                                                                                                                                                                                                                                                                                                                                                                                                         | Product data sheet | -             | 74AUP1G16 v.2 |
| Modifications: | <ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li>Type number 74AUP1G16GF (SOT891 / XSON6) removed.</li> <li><a href="#">Table 5</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> </ul> |                    |               |               |
| 74AUP1G16 v.2  | 20161007                                                                                                                                                                                                                                                                                                                                                                                                         | Product data sheet | -             | 74AUP1G16 v.1 |
| Modifications: | <ul style="list-style-type: none"> <li>Type numbers 74AUP1G16GN, 74AUP1G16GS and 74AUP1G16GX removed.</li> </ul>                                                                                                                                                                                                                                                                                                 |                    |               |               |
| 74AUP1G16 v.1  | 20151104                                                                                                                                                                                                                                                                                                                                                                                                         | 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

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

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