

# 74AUP1G06

## Low-power inverter with open-drain output

Rev. 8 — 12 February 2018

Product data sheet

## 1 General description

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The 74AUP1G06 provides the single inverting buffer with open-drain output. The output of the device is an open drain and can be connected to other open-drain outputs to implement active-LOW wired-OR or active-HIGH wired-AND functions.

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

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- 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)
- ESD protection:
  - HBM JESD22-A114F Class 3A exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 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
- 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           |        |  | Version  |
|-------------|-------------------|--------|--|----------|
|             | Temperature range | Name   | Description  |          |
| 74AUP1G06GW | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm   | SOT353-1 |
| 74AUP1G06GM | -40 °C to +125 °C | XSON6  | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm                            | SOT886   |
| 74AUP1G06GF | -40 °C to +125 °C | XSON6  | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm                               | SOT891   |
| 74AUP1G06GN | -40 °C to +125 °C | XSON6  | extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm                                  | SOT1115  |
| 74AUP1G06GS | -40 °C to +125 °C | XSON6  | extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm                                  | SOT1202  |
| 74AUP1G06GX | -40 °C to +125 °C | X2SON5 | X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 × 0.8 × 0.35 mm | SOT1226  |

### 4 Marking

Table 2. Marking

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| 74AUP1G06GW | pR                          |
| 74AUP1G06GM | pR                          |
| 74AUP1G06GF | pR                          |
| 74AUP1G06GN | pR                          |
| 74AUP1G06GS | pR                          |
| 74AUP1G06GX | pR                          |

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

### 5 Functional diagram

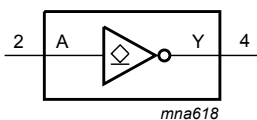


Figure 1. Logic symbol



Figure 2. IEC logic symbol

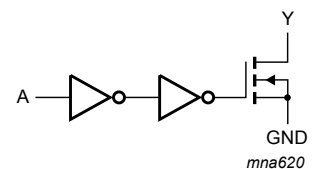


Figure 3. Logic diagram

## 6 Pinning information

### 6.1 Pinning

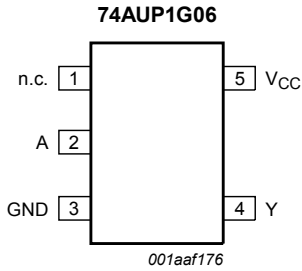


Figure 4. Pin configuration SOT353-1 (TSSOP5)

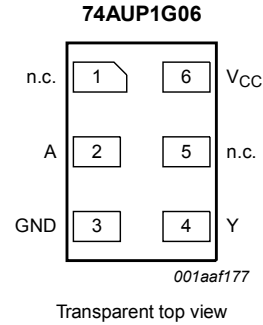


Figure 5. Pin configuration SOT886 (XSON6)

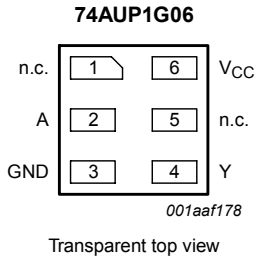


Figure 6. Pin configuration SOT891, SOT1115 and SOT1202 (XSON6)

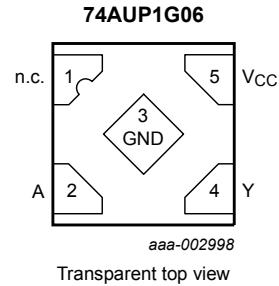


Figure 7. Pin configuration SOT1226 (X2SON5)

### 6.2 Pin description

Table 3. Pin description

| Symbol          | Pin               |       | Description    |
|-----------------|-------------------|-------|----------------|
|                 | TSSOP5 and X2SON5 | 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 <sup>[1]</sup>

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

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

## 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 $V_{CC}$         | -    | +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 TSSOP5 packages: above 87.5 °C the value of  $P_{tot}$  derates linearly with 4.0 mW/K.  
For XSON6 and X2SON5 packages: above 118 °C the value of  $P_{tot}$  derates linearly with 7.8 mW/K.

## 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>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>IL</sub> ; V <sub>O</sub> = 0 V 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; 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; 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          | -                      | -   | 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                   | output enabled; V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V                                      | -                      | 1.7 | -                      | pF   |
|  |                                      | output disabled; V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V                                     | -                      | 1.1 | -                      | 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>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>IL</sub> ; V <sub>O</sub> = 0 V 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; 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; 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          | -                      | -   | 50                     | μA   |
| <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    |

| Symbol            | Parameter                            | Conditions   | Min | Typ | Max                    | Unit |
|-------------------|--------------------------------------|--|-----|-----|------------------------|------|
| 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>IL</sub> ; V <sub>O</sub> = 0 V 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; 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; 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          | -   | -   | 75                     | μA   |

## 11 Dynamic characteristics

**Table 8. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#).

| Symbol                      | Parameter         | Conditions  | 25 °C |                    |     | -40 °C to +125 °C |             |              | Unit |
|-----------------------------|-------------------|---|-------|--------------------|-----|-------------------|-------------|--------------|------|
|                             |                   |   | Min   | Typ <sup>[1]</sup> | Max | Min               | Max (85 °C) | Max (125 °C) |      |
| <b>C<sub>L</sub> = 5 pF</b> |                   |   |       |                    |     |                   |             |              |      |
| t <sub>pd</sub>             | propagation delay | A to Y; see <a href="#">Figure 8</a> <sup>[2]</sup> |       |                    |     |                   |             |              |      |
|                             |                   | V <sub>CC</sub> = 0.8 V                             | -     | 12.8               | -   | -                 | -           | -            | ns   |
|                             |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                    | 2.3   | 4.3                | 9.9 | 2.0               | 10.9        | 12.0         | ns   |
|                             |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                    | 1.8   | 3.1                | 6.1 | 1.5               | 7.1         | 7.8          | ns   |
|                             |                   | V <sub>CC</sub> = 1.65 V to 1.95 V                  | 1.5   | 2.8                | 4.7 | 1.2               | 5.7         | 6.3          | ns   |
|                             |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                    | 1.2   | 2.2                | 3.2 | 1.0               | 3.9         | 4.3          | ns   |
|                             |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                    | 1.1   | 2.2                | 3.3 | 0.8               | 3.6         | 4.0          | ns   |

| Symbol  | Parameter                     | Conditions   | 25 °C |                    |      | -40 °C to +125 °C |             |              | Unit |
|---|-------------------------------|--|-------|--------------------|------|-------------------|-------------|--------------|------|
|   |                               |  | Min   | Typ <sup>[1]</sup> | Max  | Min               | Max (85 °C) | Max (125 °C) |      |
| <b>C<sub>L</sub> = 10 pF</b>                        |                               |  |       |                    |      |                   |             |              |      |
| t <sub>pd</sub>                                     | propagation delay             | A to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>                            |       |                    |      |                   |             |              |      |
|   |                               | V <sub>CC</sub> = 0.8 V  | -     | 15.8               | -    | -                 | -           | -            | ns   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V   | 2.7   | 5.4                | 11.2 | 2.5               | 13.2        | 15.0         | ns   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.2   | 3.9                | 7.0  | 2.0               | 8.5         | 9.4          | ns   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | 1.9   | 3.6                | 5.4  | 1.7               | 6.7         | 7.4          | ns   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.7   | 2.9                | 3.8  | 1.4               | 4.5         | 5.0          | ns   |
| V <sub>CC</sub> = 3.0 V to 3.6 V                    | 1.6                           | 3.2  | 4.6   | 1.2                | 4.9  | 5.4               | ns          |              |      |
| <b>C<sub>L</sub> = 15 pF</b>                        |                               |  |       |                    |      |                   |             |              |      |
| t <sub>pd</sub>                                     | propagation delay             | A to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>                            |       |                    |      |                   |             |              |      |
|   |                               | V <sub>CC</sub> = 0.8 V  | -     | 18.8               | -    | -                 | -           | -            | ns   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V   | 3.2   | 6.4                | 12.2 | 2.9               | 15.2        | 17.0         | ns   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.6   | 4.6                | 7.7  | 2.3               | 9.4         | 10.0         | ns   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | 2.3   | 4.5                | 6.6  | 2.1               | 7.3         | 8.1          | ns   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.1   | 3.5                | 4.6  | 1.7               | 5.1         | 5.7          | ns   |
| V <sub>CC</sub> = 3.0 V to 3.6 V                    | 2.0                           | 4.0  | 6.0   | 1.5                | 6.5  | 7.2               | ns          |              |      |
| <b>C<sub>L</sub> = 30 pF</b>                        |                               |  |       |                    |      |                   |             |              |      |
| t <sub>pd</sub>                                     | propagation delay             | A to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>                            |       |                    |      |                   |             |              |      |
|   |                               | V <sub>CC</sub> = 0.8 V  | -     | 27.8               | -    | -                 | -           | -            | ns   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V   | 4.4   | 9.3                | 16.5 | 3.9               | 19.3        | 21.3         | ns   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V   | 3.6   | 6.8                | 10.1 | 3.2               | 12.0        | 13.2         | ns   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | 3.2   | 6.8                | 10.7 | 2.9               | 11.0        | 12.1         | ns   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.9   | 5.3                | 7.2  | 2.6               | 7.8         | 8.6          | ns   |
| V <sub>CC</sub> = 3.0 V to 3.6 V                    | 2.9                           | 6.5  | 10.5  | 2.5                | 10.8 | 11.9              | ns          |              |      |
| <b>C<sub>L</sub> = 5 pF, 10 pF, 15 pF and 30 pF</b> |                               |  |       |                    |      |                   |             |              |      |
| C <sub>PD</sub>                                     | power dissipation capacitance | f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[3]</sup> |       |                    |      |                   |             |              |      |
|   |                               | V <sub>CC</sub> = 0.8 V  | -     | 0.5                | -    | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V   | -     | 0.6                | -    | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V   | -     | 0.7                | -    | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | -     | 0.7                | -    | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | -     | 1.0                | -    | -                 | -           | -            | pF   |
| V <sub>CC</sub> = 3.0 V to 3.6 V                    | -                             | 1.2  | -     | -                  | -    | -                 | pF          |              |      |

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

[2] t<sub>pd</sub> is the same as t<sub>pZL</sub> and t<sub>pLZ</sub>.

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

$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N \text{ where:}$$

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

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

N = number of inputs switching.



11.1 Waveforms and test circuit

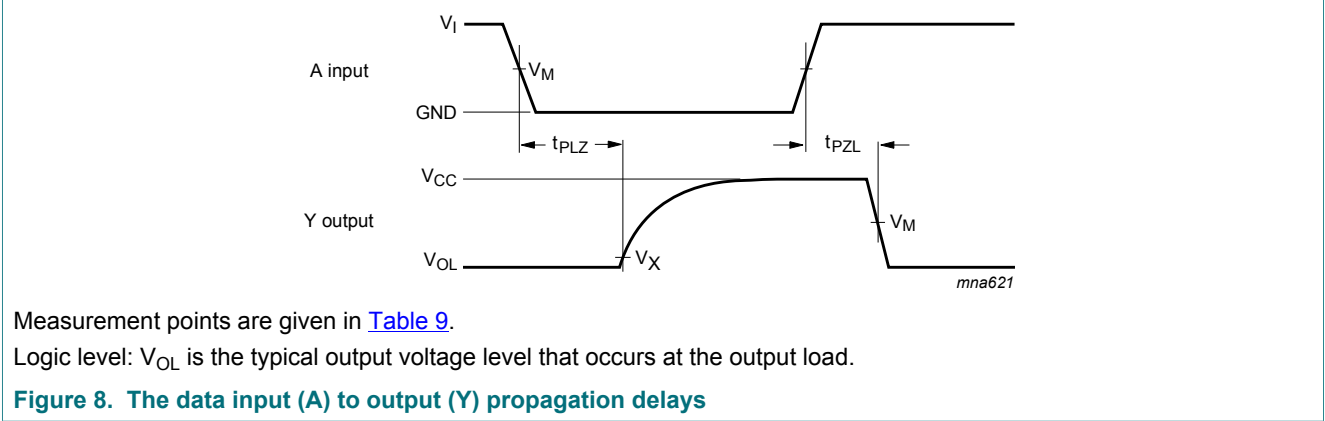


Table 9. Measurement points

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

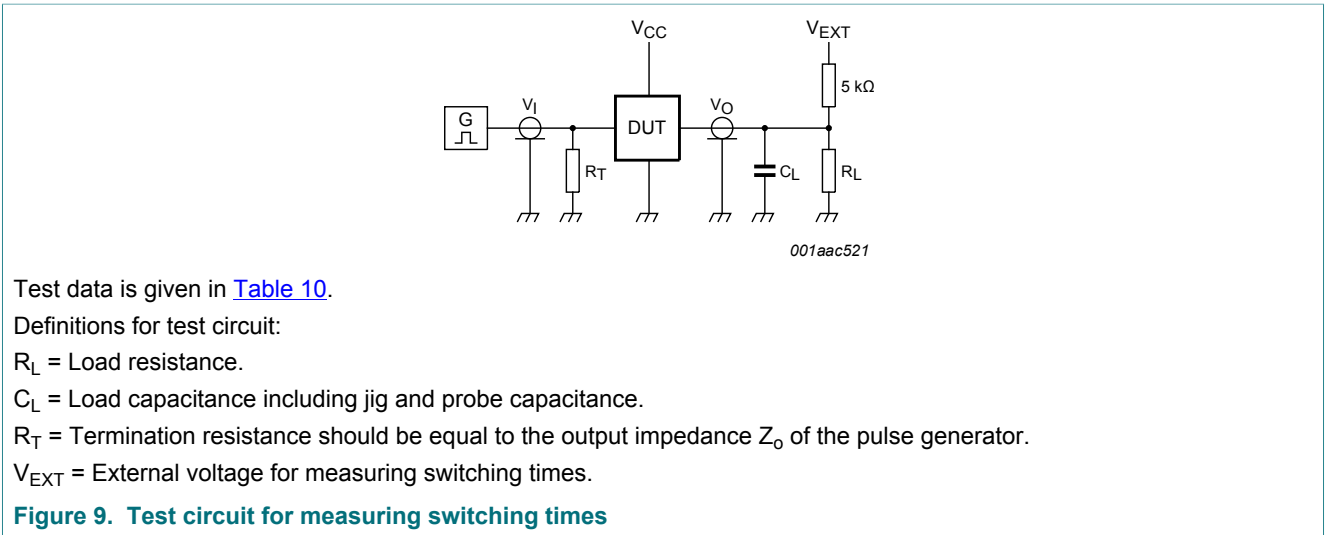


Table 10. Test data

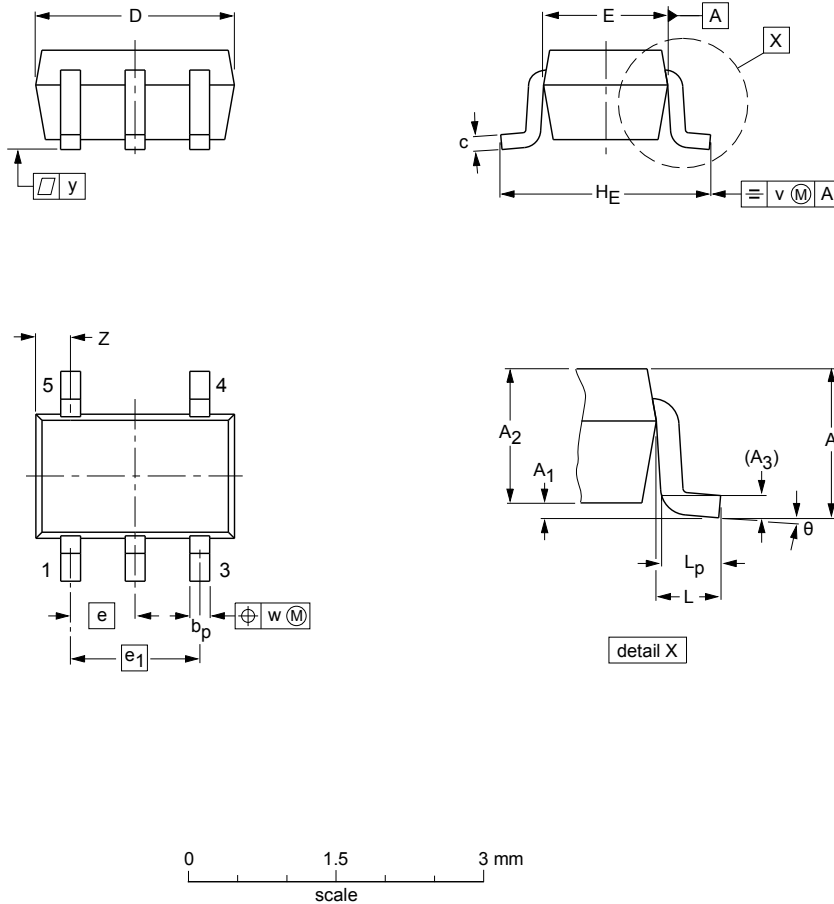
| Supply voltage | Load                         |              | $V_{EXT}$          |                    |                    |
|----------------|------------------------------|--------------|--------------------|--------------------|--------------------|
| $V_{CC}$       | $C_L$                        | $R_L$ [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



DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c            | D <sup>(1)</sup> | E <sup>(1)</sup> | e    | e <sub>1</sub> | H <sub>E</sub> | L     | L <sub>p</sub> | v   | w   | y   | Z <sup>(1)</sup> | θ        |
|------|--------|----------------|----------------|----------------|----------------|--------------|------------------|------------------|------|----------------|----------------|-------|----------------|-----|-----|-----|------------------|----------|
| mm   | 1.1    | 0.1<br>0       | 1.0<br>0.8     | 0.15           | 0.30<br>0.15   | 0.25<br>0.08 | 2.25<br>1.85     | 1.35<br>1.15     | 0.65 | 1.3            | 2.25<br>2.0    | 0.425 | 0.46<br>0.21   | 0.3 | 0.1 | 0.1 | 0.60<br>0.15     | 7°<br>0° |

Note

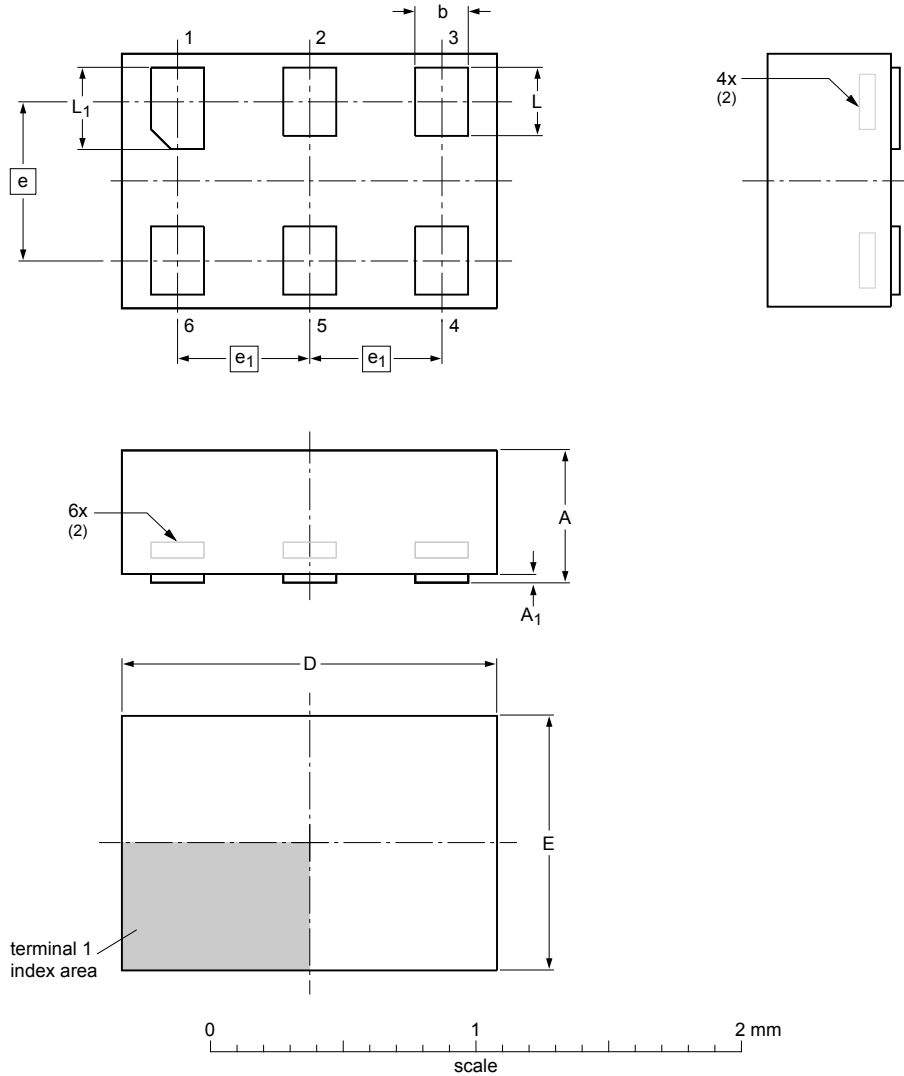
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

| OUTLINE VERSION | REFERENCES |        |        | EUROPEAN PROJECTION | ISSUE DATE           |
|-----------------|------------|--------|--------|---------------------|----------------------|
|                 | IEC        | JEDEC  | JEITA  |                     |                      |
| SOT353-1        |            | MO-203 | SC-88A |                     | 00-09-01<br>03-02-19 |

Figure 10. 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



Dimensions (mm are the original dimensions)

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e   | e <sub>1</sub> | L    | L <sub>1</sub> |
|------|------------------|----------------|------|------|------|-----|----------------|------|----------------|
| mm   | max 0.5          | 0.04           | 0.25 | 1.50 | 1.05 |     |                | 0.35 | 0.40           |
|      | nom              |                | 0.20 | 1.45 | 1.00 | 0.6 | 0.5            | 0.30 | 0.35           |
|      | min              |                | 0.17 | 1.40 | 0.95 |     |                | 0.27 | 0.32           |

Notes

- 1. Including plating thickness.
- 2. Can be visible in some manufacturing processes.

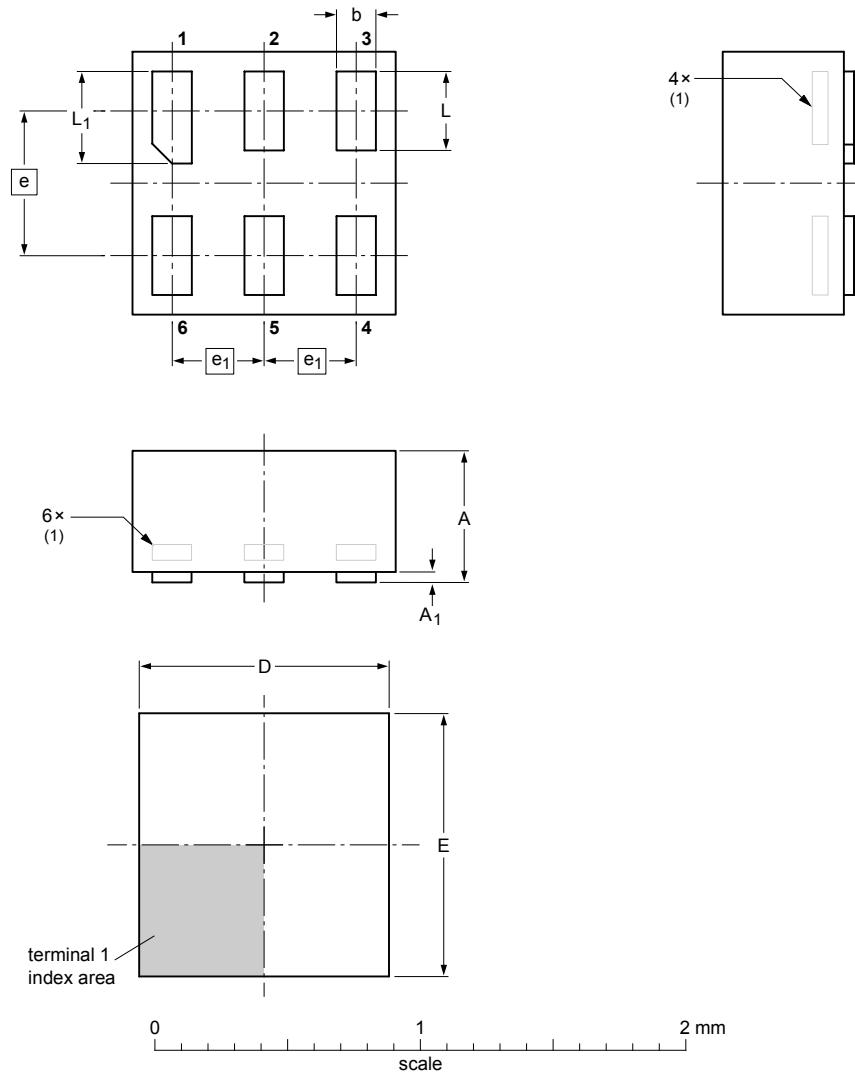
sot886\_po

| Outline version | References |        |       |  | European projection | Issue date                      |
|-----------------|------------|--------|-------|--|---------------------|---------------------------------|
|                 | IEC        | JEDEC  | JEITA |  |                     |                                 |
| SOT886          |            | MO-252 |       |  |                     | <del>04-07-22</del><br>12-01-05 |

Figure 11. Package outline SOT886 (XSON6)

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

SOT891



**DIMENSIONS (mm are the original dimensions)**

| UNIT | A<br>max | A <sub>1</sub><br>max | b            | D            | E            | e    | e <sub>1</sub> | L            | L <sub>1</sub> |
|------|----------|-----------------------|--------------|--------------|--------------|------|----------------|--------------|----------------|
| mm   | 0.5      | 0.04                  | 0.20<br>0.12 | 1.05<br>0.95 | 1.05<br>0.95 | 0.55 | 0.35           | 0.35<br>0.27 | 0.40<br>0.32   |

**Note**

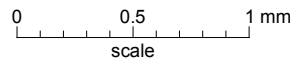
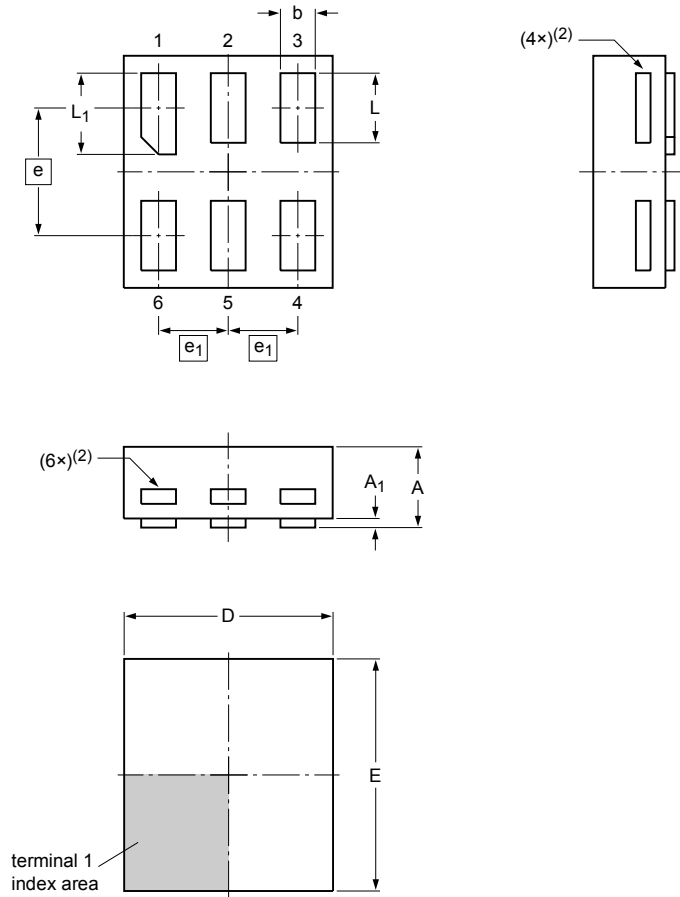
1. Can be visible in some manufacturing processes.

| OUTLINE<br>VERSION | REFERENCES |       |       | EUROPEAN<br>PROJECTION | ISSUE DATE            |
|--------------------|------------|-------|-------|------------------------|-----------------------|
|                    | IEC        | JEDEC | JEITA |                        |                       |
| SOT891             |            |       |       |                        | -05-04-06<br>07-05-15 |

Figure 12. Package outline SOT891 (XSON6)

XSON6: extremely thin small outline package; no leads;  
6 terminals; body 0.9 x 1.0 x 0.35 mm

SOT1115



Dimensions

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e    | e <sub>1</sub> | L    | L <sub>1</sub> |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| max  | 0.35             | 0.04           | 0.20 | 0.95 | 1.05 |      |                | 0.35 | 0.40           |
| nom  |                  |                | 0.15 | 0.90 | 1.00 | 0.55 | 0.3            | 0.30 | 0.35           |
| min  |                  |                | 0.12 | 0.85 | 0.95 |      |                | 0.27 | 0.32           |

Note

- Including plating thickness.
- Visible depending upon used manufacturing technology.

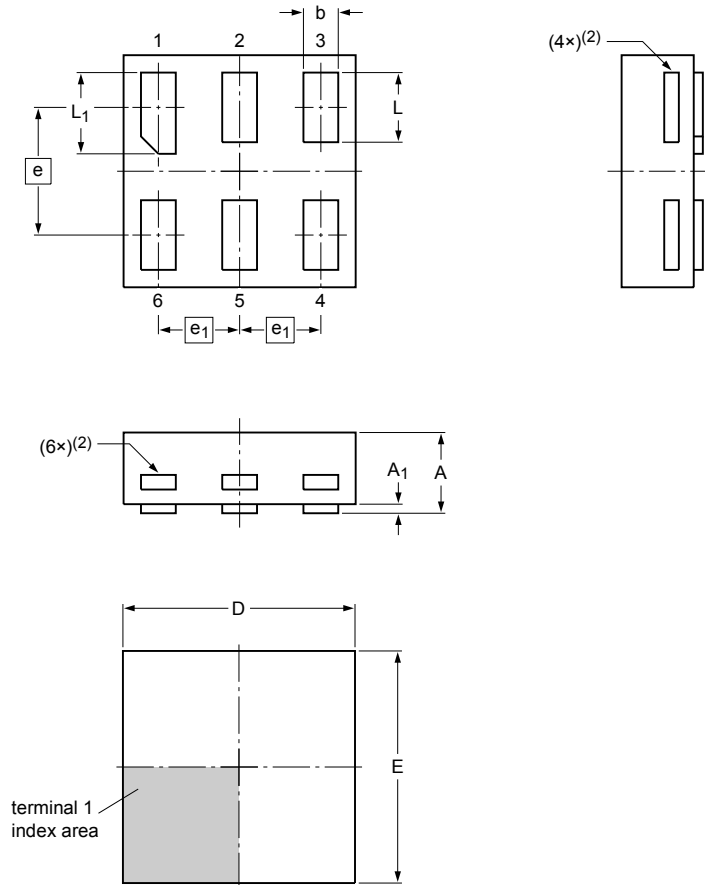
sot1115\_po

| Outline version | References |       |       |  | European projection | Issue date             |
|-----------------|------------|-------|-------|--|---------------------|------------------------|
|                 | IEC        | JEDEC | JEITA |  |                     |                        |
| SOT1115         |            |       |       |  |                     | -10-04-02-<br>10-04-07 |

Figure 13. Package outline SOT1115 (XSON6)

XSON6: extremely thin small outline package; no leads;  
6 terminals; body 1.0 x 1.0 x 0.35 mm

SOT1202



Dimensions

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e    | e <sub>1</sub> | L    | L <sub>1</sub> |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| mm   | max 0.35         | 0.04           | 0.20 | 1.05 | 1.05 |      |                | 0.35 | 0.40           |
|      | nom 0.15         | 1.00           | 1.00 | 0.55 | 0.35 | 0.30 | 0.35           |      |                |
|      | min 0.12         | 0.95           | 0.95 |      |      | 0.27 | 0.32           |      |                |

Note

- Including plating thickness.
- Visible depending upon used manufacturing technology.

sot1202\_po

| Outline version | References |       |       |  | European projection | Issue date             |
|-----------------|------------|-------|-------|--|---------------------|------------------------|
|                 | IEC        | JEDEC | JEITA |  |                     |                        |
| SOT1202         |            |       |       |  |                     | -10-04-02-<br>10-04-06 |

Figure 14. Package outline SOT1202 (XSON6)

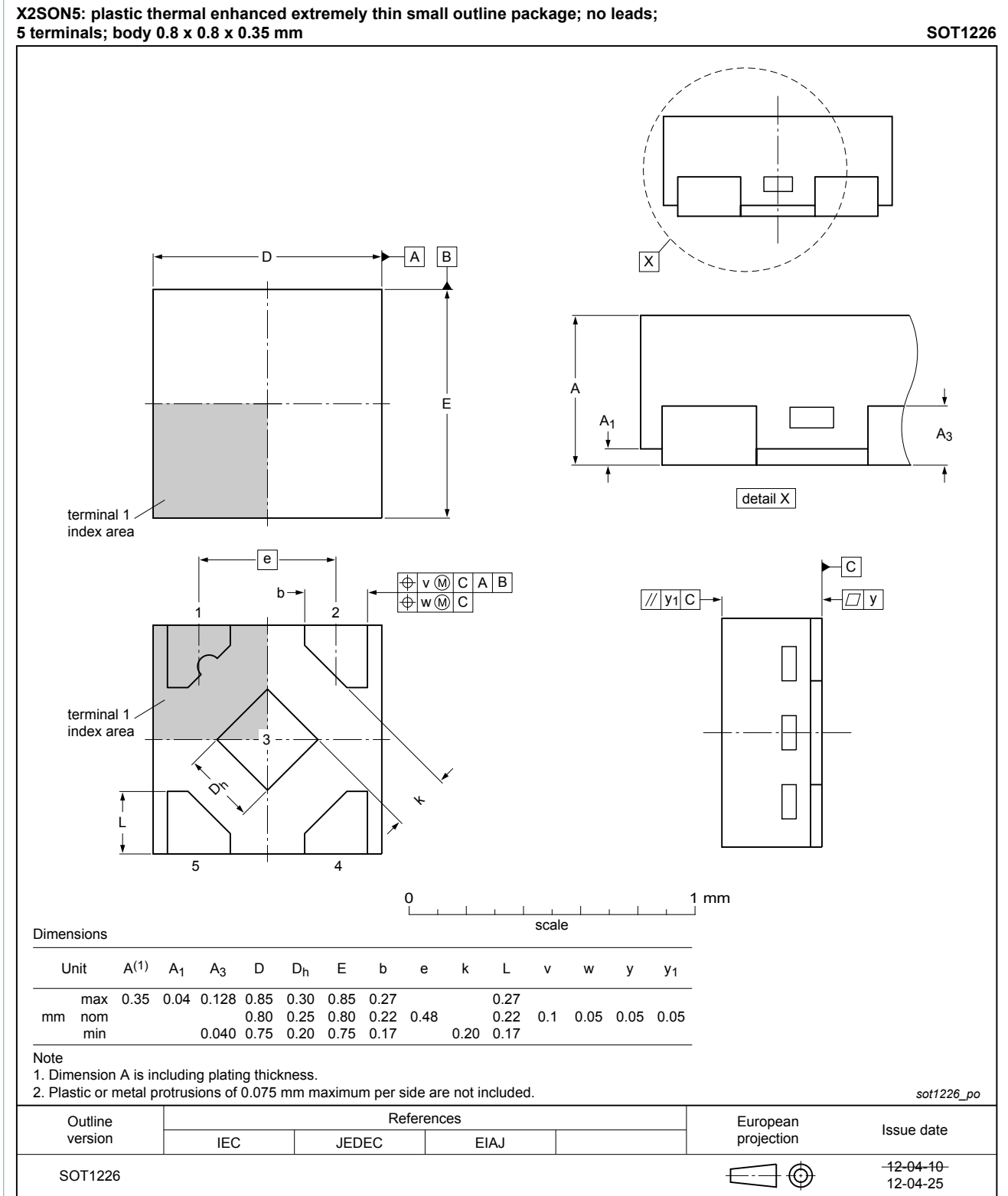


Figure 15. Package outline SOT1226 (X2SON5)

## 13 Abbreviations

Table 11. Abbreviations

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

## 14 Revision history

Table 12. Revision history

| Document ID    | Release date   | Data sheet status  | Change notice | Supersedes    |
|----------------|--|--------------------|---------------|---------------|
| 74AUP1G06 v.8  | 20180212   | Product data sheet | -             | 74AUP1G06 v.7 |
| 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>Pin configuration drawing of SOT1226 (X2SON5) updated: <a href="#">Figure 7</a></li> </ul> |                    |               |               |
| 74AUP1G06 v.7  | 20120628   | Product data sheet | -             | 74AUP1G06 v.6 |
| Modifications: | <ul style="list-style-type: none"> <li>Added type number 74AUP1G06GX (SOT1226)</li> <li>Package outline drawing of SOT886 (<a href="#">Figure 11</a>) modified.</li> </ul>   |                    |               |               |
| 74AUP1G06 v.6  | 20111115   | Product data sheet | -             | 74AUP1G06 v.5 |
| Modifications: | <ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>   |                    |               |               |
| 74AUP1G06 v.5  | 20101022   | Product data sheet | -             | 74AUP1G06 v.4 |
| 74AUP1G06 v.4  | 20090610   | Product data sheet | -             | 74AUP1G06 v.3 |
| 74AUP1G06 v.3  | 20070615   | Product data sheet | -             | 74AUP1G06 v.2 |
| 74AUP1G06 v.2  | 20060824   | Product data sheet | -             | 74AUP1G06 v.1 |
| 74AUP1G06 v.1  | 20050718   | Product data sheet | -             | -             |



## 15 Legal information

### 15.1 Data sheet status

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

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

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

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