

# 74AUP1G11

## Low-power 3-input AND gate

Rev. 01 — 4 September 2007

Product data sheet

## 1. General description

The 74AUP1G11 provides a low-power, low-voltage single 3-input AND gate.

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

- 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-A114E Class 3A exceeds 5000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
  - ◆ CDM JESD22-C101C 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**

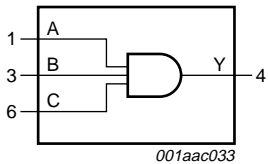
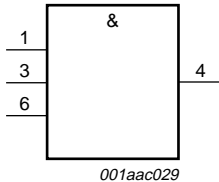
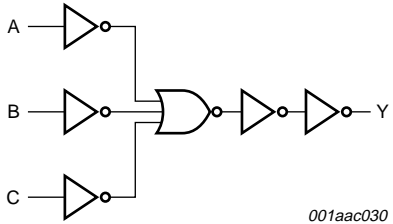
| Type number | Package           |       |   | Version |
|-------------|-------------------|-------|---|---------|
|             | Temperature range | Name  | Description   |         |
| 74AUP1G11GW | -40 °C to +125 °C | SC-88 | plastic surface-mounted package; 6 leads  | SOT363  |
| 74AUP1G11GM | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm | SOT886  |
| 74AUP1G11GF | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm    | SOT891  |

### 4. Marking

**Table 2. Marking**

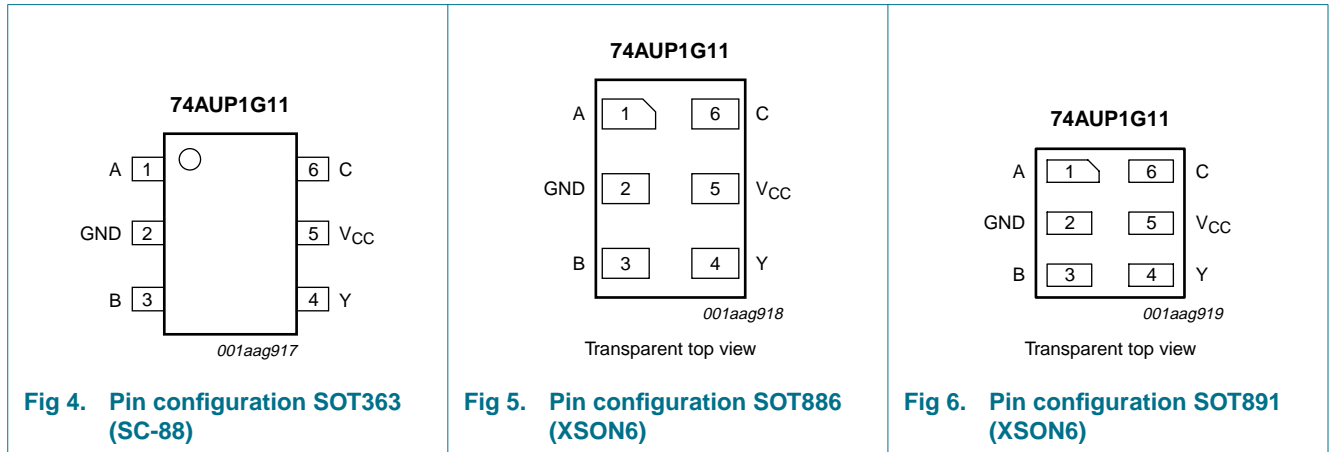
| Type number | Marking code |
|-------------|--------------|
| 74AUP1G11GW | pU           |
| 74AUP1G11GM | pU           |
| 74AUP1G11GF | pU           |

### 5. Functional diagram

|   |   |  |
|---|---|--|
|  <p><b>Fig 1. Logic symbol</b></p> |  <p><b>Fig 2. IEC logic symbol</b></p> |  <p><b>Fig 3. Logic diagram</b></p> |
|---|---|--|

## 6. Pinning information

### 6.1 Pinning



### 6.2 Pin description

**Table 3. Pin description**

| Symbol          | Pin | Description    |
|-----------------|-----|----------------|
| A               | 1   | data input     |
| GND             | 2   | ground (0 V)   |
| B               | 3   | data input     |
| Y               | 4   | data output    |
| V <sub>CC</sub> | 5   | supply voltage |
| C               | 6   | data input     |

## 7. Functional description

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

| Input |   |   | Output |
|-------|---|---|--------|
| A     | B | C | Y      |
| H     | H | H | H      |
| L     | X | X | L      |
| X     | L | X | L      |
| X     | X | L | L      |

[1] H = HIGH voltage level;  
L = LOW voltage level;  
X = don't care.

## 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           |                                 | [1] -0.5 | +4.6     | V    |
| $I_{OK}$  | output clamping current | $V_O > V_{CC}$ or $V_O < 0$ V   | -        | $\pm 50$ | mA   |
| $V_O$     | output voltage          | Active mode and Power-down mode | [1] -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   | [2] -    | 250      | mW   |

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

[2] For SC-88 packages: above 87.5 °C the value of  $P_{tot}$  derates linearly with 4.0 mW/K.  
 For XSON6 packages: above 45 °C the value of  $P_{tot}$  derates linearly with 2.4 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       | -   | 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    |
| 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>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   |
|                                |                                      | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V                           | -                      | -   | ±0.2                   | 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          | <a href="#">[1]</a>    | -   | 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   |

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

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

| 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    |    |
| 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>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; 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          | [1] | -                      | 50   | μA |

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

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

| 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    |
| 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>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; 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          | [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 [Figure 8](#).

| 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, B and C to Y;<br>see <a href="#">Figure 7</a> |       |                    |      |                   |             |              |      |
|                              |                   | V <sub>CC</sub> = 0.8 V                          | -     | 18.9               | -    | -                 | -           | -            | ns   |
|                              |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                 | 3.0   | 5.6                | 9.5  | 2.8               | 9.9         | 10.0         | ns   |
|                              |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                 | 2.3   | 3.9                | 5.9  | 2.2               | 6.5         | 6.8          | ns   |
|                              |                   | V <sub>CC</sub> = 1.65 V to 1.95 V               | 1.9   | 3.1                | 4.8  | 1.8               | 5.3         | 5.5          | ns   |
|                              |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                 | 1.6   | 2.5                | 3.6  | 1.4               | 4.0         | 4.2          | ns   |
|                              |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                 | 1.3   | 2.2                | 3.2  | 1.2               | 3.5         | 3.7          | ns   |
| <b>C<sub>L</sub> = 10 pF</b> |                   |  |       |                    |      |                   |             |              |      |
| t <sub>pd</sub>              | propagation delay | A, B and C to Y;<br>see <a href="#">Figure 7</a> |       |                    |      |                   |             |              |      |
|                              |                   | V <sub>CC</sub> = 0.8 V                          | -     | 22.5               | -    | -                 | -           | -            | ns   |
|                              |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                 | 3.5   | 6.5                | 11.1 | 3.3               | 11.6        | 11.8         | ns   |
|                              |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                 | 2.8   | 4.5                | 6.8  | 2.6               | 7.5         | 7.8          | ns   |
|                              |                   | V <sub>CC</sub> = 1.65 V to 1.95 V               | 2.4   | 3.7                | 5.6  | 2.1               | 6.2         | 6.4          | ns   |
|                              |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                 | 1.9   | 3.0                | 4.4  | 1.7               | 4.8         | 5.1          | ns   |
|                              |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                 | 1.7   | 2.8                | 4.0  | 1.5               | 4.3         | 4.5          | ns   |
| <b>C<sub>L</sub> = 15 pF</b> |                   |  |       |                    |      |                   |             |              |      |
| t <sub>pd</sub>              | propagation delay | A, B and C to Y;<br>see <a href="#">Figure 7</a> |       |                    |      |                   |             |              |      |
|                              |                   | V <sub>CC</sub> = 0.8 V                          | -     | 23.6               | -    | -                 | -           | -            | ns   |
|                              |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                 | 3.9   | 7.3                | 12.5 | 3.6               | 13.3        | 13.4         | ns   |
|                              |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                 | 3.2   | 5.1                | 7.6  | 2.9               | 8.5         | 8.8          | ns   |
|                              |                   | V <sub>CC</sub> = 1.65 V to 1.95 V               | 2.7   | 4.2                | 6.3  | 2.4               | 6.9         | 7.3          | ns   |
|                              |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                 | 2.3   | 3.5                | 5.0  | 2.0               | 5.5         | 5.8          | ns   |
|                              |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                 | 2.0   | 3.2                | 4.6  | 1.8               | 5.0         | 5.2          | ns   |
| <b>C<sub>L</sub> = 30 pF</b> |                   |  |       |                    |      |                   |             |              |      |
| t <sub>pd</sub>              | propagation delay | A, B and C to Y;<br>see <a href="#">Figure 7</a> |       |                    |      |                   |             |              |      |
|                              |                   | V <sub>CC</sub> = 0.8 V                          | -     | 36.3               | -    | -                 | -           | -            | ns   |
|                              |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                 | 5.1   | 9.5                | 16.8 | 4.8               | 17.9        | 18.3         | ns   |
|                              |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                 | 4.2   | 6.7                | 10.0 | 3.8               | 11.3        | 11.8         | ns   |
|                              |                   | V <sub>CC</sub> = 1.65 V to 1.95 V               | 3.6   | 5.5                | 8.1  | 3.2               | 9.1         | 9.7          | ns   |
|                              |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                 | 3.0   | 4.6                | 6.6  | 2.8               | 7.2         | 7.5          | ns   |
|                              |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                 | 2.7   | 4.3                | 6.1  | 2.5               | 6.6         | 6.9          | ns   |

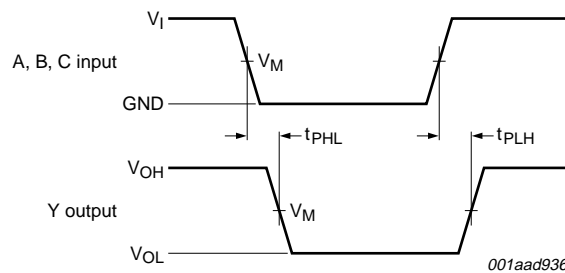


**Table 8. Dynamic characteristics ...continued**  
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

| 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, 10 pF, 15 pF and 30 pF</b> |                               |  |       |                    |     |                   |             |              |      |
| C <sub>PD</sub>                                     | power dissipation capacitance | f <sub>i</sub> = 1 MHz;<br>V <sub>I</sub> = GND to V <sub>CC</sub> |       |                    |     |                   |             |              |      |
|   |                               | V <sub>CC</sub> = 0.8 V  | -     | 2.7                | -   | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                                   | -     | 2.8                | -   | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                                   | -     | 2.9                | -   | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                 | -     | 3.1                | -   | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                   | -     | 3.5                | -   | -                 | -           | -            | pF   |
|   |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                   | -     | 4.1                | -   | -                 | -           | -            | 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> = load capacitance in pF;  
 V<sub>CC</sub> = supply voltage in V;  
 N = number of inputs switching;  
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

## 12. Waveforms

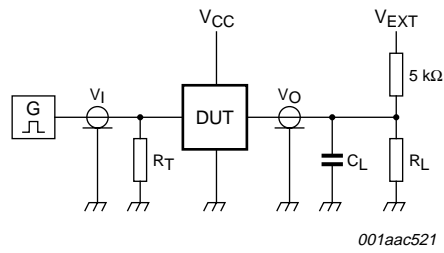


Measurement points are given in [Table 9](#).  
 Logic levels: V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage drop that occur with the output load.

**Fig 7. Input A, B and C to output Y propagation delay times**

**Table 9. Measurement points**

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



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 8. Load circuitry for 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  $R_L = 1 \text{ M}\Omega$ .

13. Package outline

Plastic surface-mounted package; 6 leads

SOT363

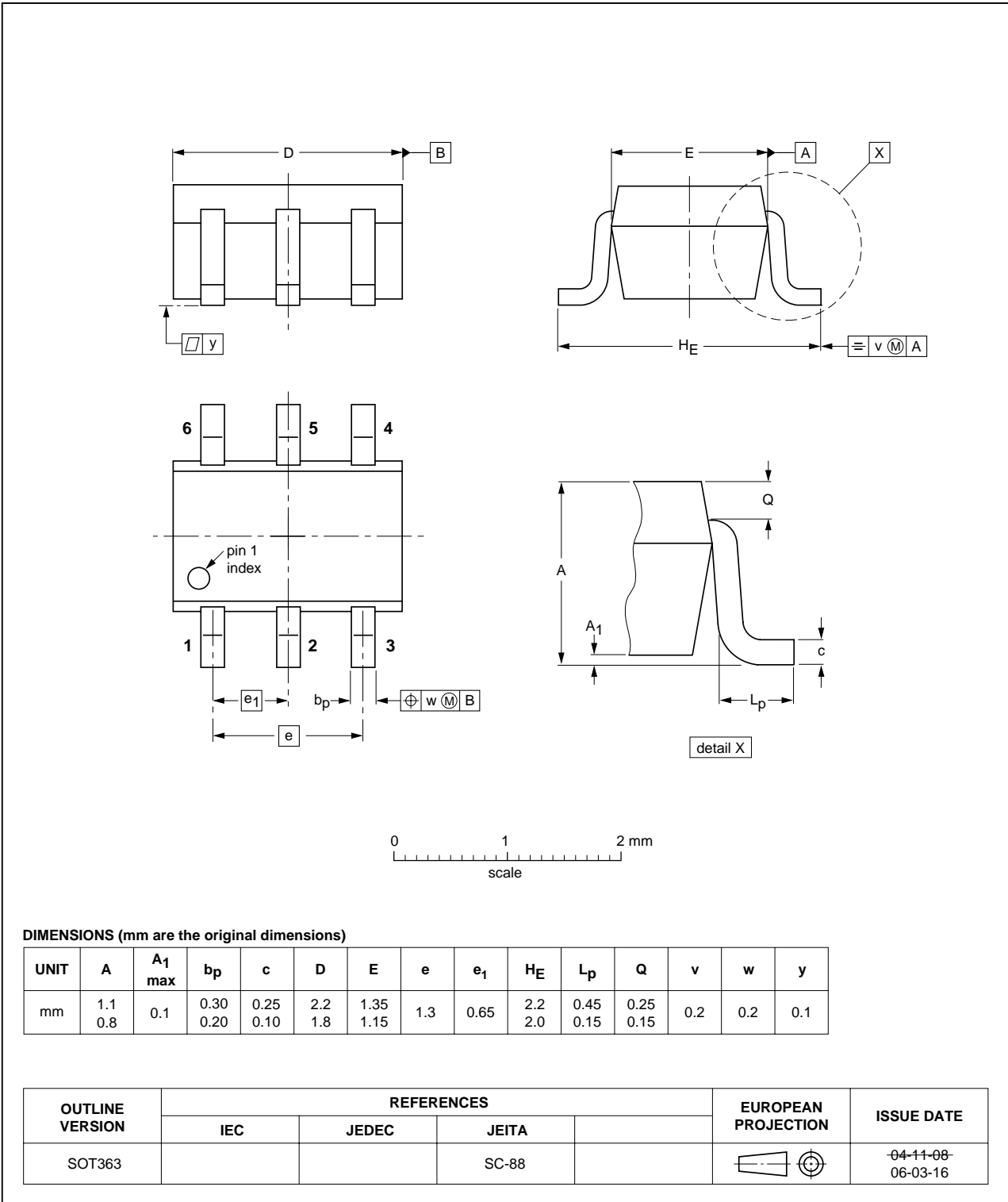


Fig 9. Package outline SOT363 (SC-88)

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

SOT886



Fig 10. Package outline SOT886 (XSON6)

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

SOT891

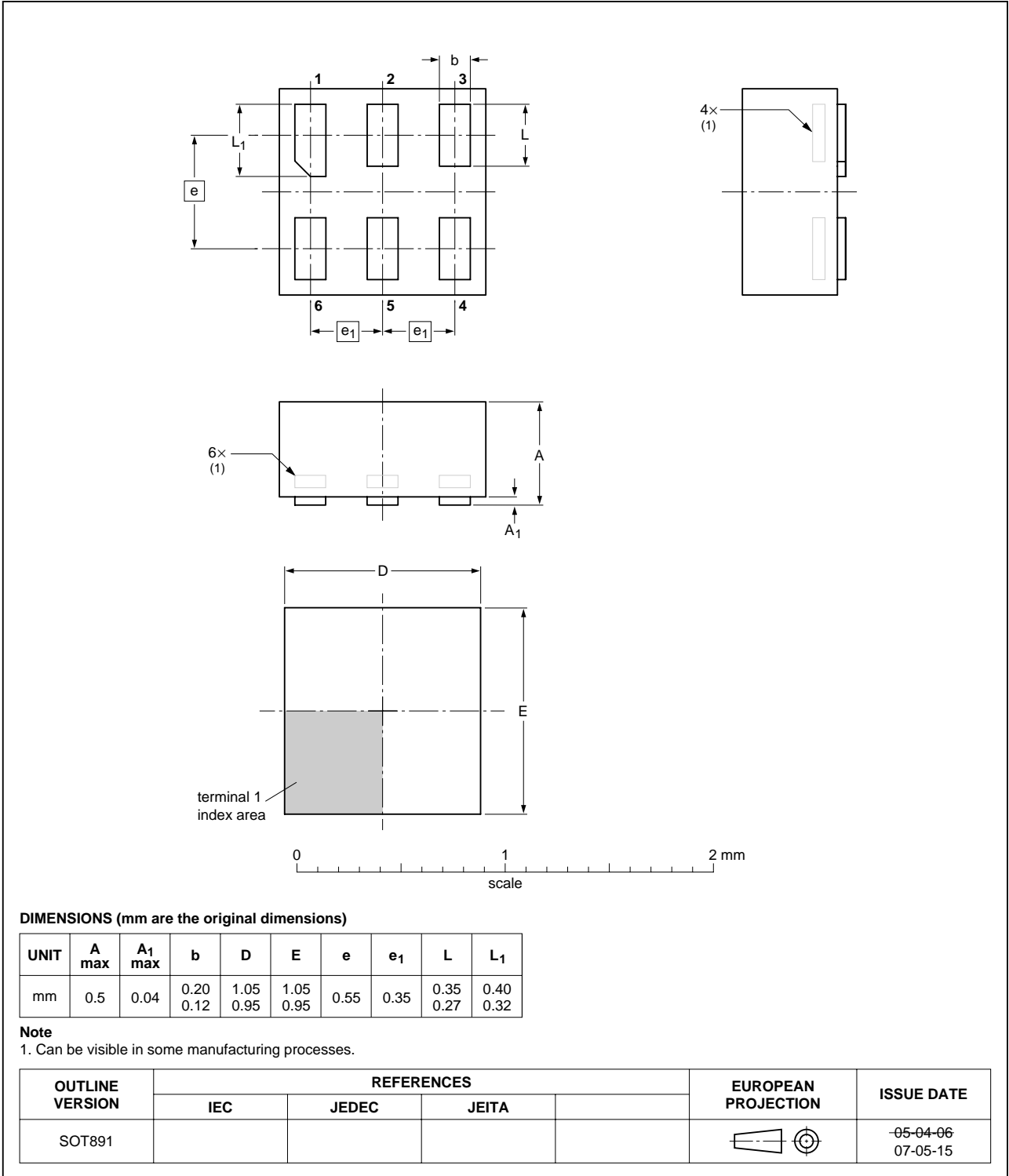


Fig 11. Package outline SOT891 (XSON6)

## 14. Abbreviations

Table 11. Abbreviations

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

## 15. Revision history

Table 12. Revision history

| Document ID | Release date | Data sheet status  | Change notice | Supersedes |
|-------------|--------------|--------------------|---------------|------------|
| 74AUP1G11_1 | 20070904     | Product data sheet | -             | -          |

## 16. Legal information

### 16.1 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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