

74AUP1G126

Low-power buffer/line driver; 3-state

Rev. 5 — 28 June 2012

Product data sheet

1. General description

The 74AUP1G126 provides a single non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input (OE). A LOW level at pin OE causes the output to assume a high-impedance OFF-state. This device has the input-disable feature, which allows floating input signals. The inputs are disabled when the output enable input OE is LOW.

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 a 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)
- 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}
- Input-disable feature allows floating input conditions
- 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 | |
| 74AUP1G126GW | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm | SOT353-1 |
| 74AUP1G126GM | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm | SOT886 |
| 74AUP1G126GF | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm | SOT891 |
| 74AUP1G126GN | -40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm | SOT1115 |
| 74AUP1G126GS | -40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm | SOT1202 |
| 74AUP1G126GX | -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 |

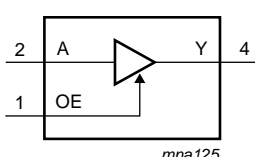
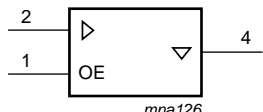
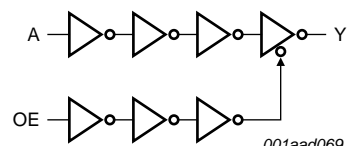
4. Marking

Table 2. Marking

| Type number | Marking code ^[1] |
|--------------|-----------------------------|
| 74AUP1G126GW | pN |
| 74AUP1G126GM | pN |
| 74AUP1G126GF | pN |
| 74AUP1G126GN | pN |
| 74AUP1G126GS | pN |
| 74AUP1G126GX | pN |

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

5. Functional diagram

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

6. Pinning information

6.1 Pinning

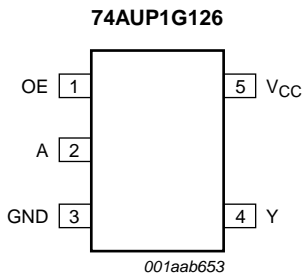


Fig 4. Pin configuration SOT353-1

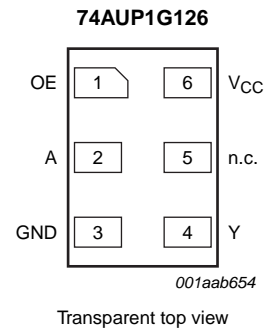


Fig 5. Pin configuration SOT886

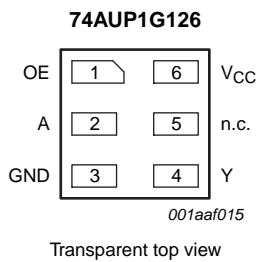


Fig 6. Pin configuration SOT891, SOT1115 and SOT1202

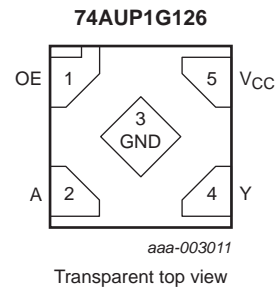


Fig 7. Pin configuration SOT1226 (X2SON5)

6.2 Pin description

Table 3. Pin description

| Symbol | Pin | | Description |
|-----------------|-------------------|-------|---------------------|
| | TSSOP5 and X2SON5 | XSON6 | |
| OE | 1 | 1 | output enable input |
| A | 2 | 2 | data input |
| GND | 3 | 3 | ground (0 V) |
| Y | 4 | 4 | data output |
| n.c. | - | 5 | not connected |
| V _{CC} | 5 | 6 | supply voltage |

7. Functional description

Table 4. Function table^[1]

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

- [1] H = HIGH voltage level;
L = LOW voltage level;
X = Don't care;
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 | | [1] -0.5 | +4.6 | V |
| I_{OK} | output clamping current | $V_O < 0$ V | -0.5 | - | mA |
| V_O | output voltage | Active mode | [1] -0.5 | $V_{CC} + 0.5$ | V |
| | | Power-down mode | [1] -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 | [2] - | 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 | |
|--------------------------------|---------------------------|---|---|-----|------------------------|------|----|
| T_{amb} = 25 °C | | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 0.8 V | 0.70 × V _{CC} | - | - | V | |
| | | V _{CC} = 0.9 V to 1.95 V | 0.65 × V _{CC} | - | - | V | |
| | | V _{CC} = 2.3 V to 2.7 V | 1.6 | - | - | V | |
| | | V _{CC} = 3.0 V to 3.6 V | 2.0 | - | - | V | |
| V _{IL} | LOW-level input voltage | V _{CC} = 0.8 V | - | - | 0.30 × V _{CC} | V | |
| | | V _{CC} = 0.9 V to 1.95 V | - | - | 0.35 × V _{CC} | V | |
| | | V _{CC} = 2.3 V to 2.7 V | - | - | 0.7 | V | |
| | | V _{CC} = 3.0 V to 3.6 V | - | - | 0.9 | V | |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} | | | | | |
| | | I _O = -20 μA; V _{CC} = 0.8 V to 3.6 V | V _{CC} - 0.1 | - | - | V | |
| | | I _O = -1.1 mA; V _{CC} = 1.1 V | 0.75 × V _{CC} | - | - | V | |
| | | I _O = -1.7 mA; V _{CC} = 1.4 V | 1.11 | - | - | V | |
| | | I _O = -1.9 mA; V _{CC} = 1.65 V | 1.32 | - | - | V | |
| | | I _O = -2.3 mA; V _{CC} = 2.3 V | 2.05 | - | - | V | |
| | | I _O = -3.1 mA; V _{CC} = 2.3 V | 1.9 | - | - | V | |
| | | I _O = -2.7 mA; V _{CC} = 3.0 V | 2.72 | - | - | V | |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | | |
| | | I _O = 20 μA; V _{CC} = 0.8 V to 3.6 V | - | - | 0.1 | V | |
| | | I _O = 1.1 mA; V _{CC} = 1.1 V | - | - | 0.3 × V _{CC} | V | |
| | | I _O = 1.7 mA; V _{CC} = 1.4 V | - | - | 0.31 | V | |
| | | I _O = 1.9 mA; V _{CC} = 1.65 V | - | - | 0.31 | V | |
| | | I _O = 2.3 mA; V _{CC} = 2.3 V | - | - | 0.31 | V | |
| | | I _O = 3.1 mA; V _{CC} = 2.3 V | - | - | 0.44 | V | |
| | | I _O = 2.7 mA; V _{CC} = 3.0 V | - | - | 0.31 | V | |
| | I _I | input leakage current | V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V | - | - | ±0.1 | μA |
| | I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _O = 0 V to 3.6 V; V _{CC} = 0 V to 3.6 V | - | - | ±0.1 | μA |
| | I _{OFF} | power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V | - | - | ±0.2 | μA |
| | ΔI _{OFF} | additional power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V | - | - | ±0.2 | μA |
| | I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V | - | - | 0.5 | 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 |
|---|---------------------------|--|----------------------|-----|----------------------|---------|
| ΔI_{CC} | additional supply current | data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V | [1] | - | 40 | μ A |
| | | OE input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V | [1] | - | 110 | μ A |
| | | all inputs; $V_I =$ GND to 3.6 V; OE = GND; $V_{CC} = 0.8$ V to 3.6 V | [2] | - | 1 | μ A |
| C_I | input capacitance | $V_{CC} = 0$ V to 3.6 V; $V_I =$ GND or V_{CC} | - | 0.9 | - | pF |
| C_O | output capacitance | output enabled; $V_O =$ GND; $V_{CC} = 0$ V | - | 1.7 | - | pF |
| | | output disabled; $V_{CC} = 0$ V to 3.6 V; $V_O =$ GND or V_{CC} | - | 1.5 | - | pF |
| $T_{amb} = -40$ °C to $+85$ °C | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 0.8$ V | $0.70 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 0.9$ V to 1.95 V | $0.65 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 2.3$ V to 2.7 V | 1.6 | - | - | V |
| | | $V_{CC} = 3.0$ V to 3.6 V | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 0.8$ V | - | - | $0.30 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9$ V to 1.95 V | - | - | $0.35 \times V_{CC}$ | V |
| | | $V_{CC} = 2.3$ V to 2.7 V | - | - | 0.7 | V |
| | | $V_{CC} = 3.0$ V to 3.6 V | - | - | 0.9 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20$ μ A; $V_{CC} = 0.8$ V to 3.6 V | $V_{CC} - 0.1$ | - | - | V |
| | | $I_O = -1.1$ mA; $V_{CC} = 1.1$ V | $0.7 \times V_{CC}$ | - | - | V |
| | | $I_O = -1.7$ mA; $V_{CC} = 1.4$ V | 1.03 | - | - | V |
| | | $I_O = -1.9$ mA; $V_{CC} = 1.65$ V | 1.30 | - | - | V |
| | | $I_O = -2.3$ mA; $V_{CC} = 2.3$ V | 1.97 | - | - | V |
| | | $I_O = -3.1$ mA; $V_{CC} = 2.3$ V | 1.85 | - | - | V |
| | | $I_O = -2.7$ mA; $V_{CC} = 3.0$ V | 2.67 | - | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = 20$ μ A; $V_{CC} = 0.8$ V to 3.6 V | - | - | 0.1 | V |
| | | $I_O = 1.1$ mA; $V_{CC} = 1.1$ V | - | - | $0.3 \times V_{CC}$ | V |
| | | $I_O = 1.7$ mA; $V_{CC} = 1.4$ V | - | - | 0.37 | V |
| | | $I_O = 1.9$ mA; $V_{CC} = 1.65$ V | - | - | 0.35 | V |
| | | $I_O = 2.3$ mA; $V_{CC} = 2.3$ V | - | - | 0.33 | V |
| | | $I_O = 3.1$ mA; $V_{CC} = 2.3$ V | - | - | 0.45 | V |
| | | $I_O = 2.7$ mA; $V_{CC} = 3.0$ V | - | - | 0.33 | V |
| I_I | input leakage current | $V_I =$ GND to 3.6 V; $V_{CC} = 0$ V to 3.6 V | - | - | ± 0.5 | μ A |
| | | $V_I = V_{IH}$ or V_{IL} ; $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 3.6 V | - | - | ± 0.5 | μ A |
| I_{OFF} | power-off leakage current | V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V | - | - | ± 0.5 | μ A |

Table 7. Static characteristics ...continued

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|--------------------------------------|---|----------------------|-----|----------------------|---------|
| ΔI_{OFF} | additional power-off leakage current | V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V | - | - | ± 0.6 | μ A |
| I_{CC} | supply current | $V_I =$ GND or V_{CC} ; $I_O = 0$ A; $V_{CC} = 0.8$ V to 3.6 V | - | - | 0.9 | μ A |
| ΔI_{CC} | additional supply current | data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V | [1] | - | 50 | μ A |
| | | OE input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V | [1] | - | 120 | μ A |
| | | all inputs; $V_I =$ GND to 3.6 V; OE = GND; $V_{CC} = 0.8$ V to 3.6 V | [2] | - | 1 | μ A |
| $T_{amb} = -40$ °C to $+125$ °C | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 0.8$ V | $0.75 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 0.9$ V to 1.95 V | $0.70 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 2.3$ V to 2.7 V | 1.6 | - | - | V |
| | | $V_{CC} = 3.0$ V to 3.6 V | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 0.8$ V | - | - | $0.25 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9$ V to 1.95 V | - | - | $0.30 \times V_{CC}$ | V |
| | | $V_{CC} = 2.3$ V to 2.7 V | - | - | 0.7 | V |
| | | $V_{CC} = 3.0$ V to 3.6 V | - | - | 0.9 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20$ μ A; $V_{CC} = 0.8$ V to 3.6 V | $V_{CC} - 0.11$ | - | - | V |
| | | $I_O = -1.1$ mA; $V_{CC} = 1.1$ V | $0.6 \times V_{CC}$ | - | - | V |
| | | $I_O = -1.7$ mA; $V_{CC} = 1.4$ V | 0.93 | - | - | V |
| | | $I_O = -1.9$ mA; $V_{CC} = 1.65$ V | 1.17 | - | - | V |
| | | $I_O = -2.3$ mA; $V_{CC} = 2.3$ V | 1.77 | - | - | V |
| | | $I_O = -3.1$ mA; $V_{CC} = 2.3$ V | 1.67 | - | - | V |
| | | $I_O = -2.7$ mA; $V_{CC} = 3.0$ V | 2.40 | - | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = 20$ μ A; $V_{CC} = 0.8$ V to 3.6 V | - | - | 0.11 | V |
| | | $I_O = 1.1$ mA; $V_{CC} = 1.1$ V | - | - | $0.33 \times V_{CC}$ | V |
| | | $I_O = 1.7$ mA; $V_{CC} = 1.4$ V | - | - | 0.41 | V |
| | | $I_O = 1.9$ mA; $V_{CC} = 1.65$ V | - | - | 0.39 | V |
| | | $I_O = 2.3$ mA; $V_{CC} = 2.3$ V | - | - | 0.36 | V |
| | | $I_O = 3.1$ mA; $V_{CC} = 2.3$ V | - | - | 0.50 | V |
| | | $I_O = 2.7$ mA; $V_{CC} = 3.0$ V | - | - | 0.36 | V |
| I_I | input leakage current | $V_I =$ GND to 3.6 V; $V_{CC} = 0$ V to 3.6 V | - | - | ± 0.75 | μ A |
| | | $V_I = V_{IH}$ or V_{IL} ; $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 3.6 V | - | - | ± 0.75 | μ A |
| I_{OFF} | power-off leakage current | V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V | - | - | ± 0.75 | μ A |

Table 7. Static characteristics ...continued

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--------------------------------------|--|-----|-----|------------|---------|
| ΔI_{OFF} | additional power-off leakage current | V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V | - | - | ± 0.75 | μA |
| I_{CC} | supply current | $V_I = GND$ or V_{CC} ; $I_O = 0$ A; $V_{CC} = 0.8$ V to 3.6 V | - | - | 1.4 | μA |
| ΔI_{CC} | additional supply current | data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V | [1] | - | 75 | μA |
| | | OE input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V | [1] | - | 180 | μA |
| | | all inputs; $V_I = GND$ to 3.6 V; OE = GND; $V_{CC} = 0.8$ V to 3.6 V | [2] | - | 1 | μA |

[1] One input at $V_{CC} - 0.6$ V, other input at V_{CC} or GND.

[2] To show I_{CC} remains very low when the input-disable feature is enabled.

11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

| Symbol | Parameter | Conditions | Min | Typ [1] | Max | Unit |
|--|-------------------|---------------------------------------|-----|---------|------|------|
| $T_{amb} = 25$ °C; $C_L = 5$ pF | | | | | | |
| t_{pd} | propagation delay | A to Y; see Figure 8 | [2] | | | |
| | | $V_{CC} = 0.8$ V | - | 20.6 | - | ns |
| | | $V_{CC} = 1.1$ V to 1.3 V | 2.8 | 5.5 | 10.5 | ns |
| | | $V_{CC} = 1.4$ V to 1.6 V | 2.2 | 3.9 | 6.1 | ns |
| | | $V_{CC} = 1.65$ V to 1.95 V | 1.9 | 3.2 | 4.8 | ns |
| | | $V_{CC} = 2.3$ V to 2.7 V | 1.6 | 2.6 | 3.6 | ns |
| | | $V_{CC} = 3.0$ V to 3.6 V | 1.4 | 2.4 | 3.1 | ns |
| t_{en} | enable time | OE to Y; see Figure 9 | [3] | | | |
| | | $V_{CC} = 0.8$ V | - | 71.6 | - | ns |
| | | $V_{CC} = 1.1$ V to 1.3 V | 2.8 | 6.2 | 12.4 | ns |
| | | $V_{CC} = 1.4$ V to 1.6 V | 2.3 | 4.2 | 6.9 | ns |
| | | $V_{CC} = 1.65$ V to 1.95 V | 1.9 | 3.3 | 5.3 | ns |
| | | $V_{CC} = 2.3$ V to 2.7 V | 1.5 | 2.4 | 3.6 | ns |
| | | $V_{CC} = 3.0$ V to 3.6 V | 1.3 | 2.0 | 2.9 | ns |
| t_{dis} | disable time | OE to Y; see Figure 9 | [4] | | | |
| | | $V_{CC} = 0.8$ V | - | 10.3 | - | ns |
| | | $V_{CC} = 1.1$ V to 1.3 V | 2.6 | 4.2 | 6.2 | ns |
| | | $V_{CC} = 1.4$ V to 1.6 V | 2.1 | 3.2 | 4.4 | ns |
| | | $V_{CC} = 1.65$ V to 1.95 V | 2.1 | 3.1 | 4.4 | ns |
| | | $V_{CC} = 2.3$ V to 2.7 V | 1.7 | 2.4 | 3.2 | ns |
| | | $V_{CC} = 3.0$ V to 3.6 V | 2.1 | 2.8 | 3.6 | ns |

Table 8. Dynamic characteristics ...continuedVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

| Symbol | Parameter | Conditions | Min | Typ ^[1] | Max | Unit |
|---|-------------------|---|-----|--------------------|------|------|
| T_{amb} = 25 °C; C_L = 10 pF | | | | | | |
| t _{pd} | propagation delay | see Figure 8 ^[2] | | | | |
| | | V _{CC} = 0.8 V | - | 24.0 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.2 | 6.4 | 12.3 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.1 | 4.5 | 7.3 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.9 | 3.8 | 5.5 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.1 | 3.2 | 4.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.8 | 3.0 | 3.8 | ns |
| t _{en} | enable time | see Figure 9 ^[3] | | | | |
| | | V _{CC} = 0.8 V | - | 75.3 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.2 | 7.1 | 14.1 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.2 | 4.8 | 8.0 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.8 | 3.9 | 5.9 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.5 | 2.9 | 4.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.4 | 2.6 | 3.6 | ns |
| t _{dis} | disable time | see Figure 9 ^[4] | | | | |
| | | V _{CC} = 0.8 V | - | 12.2 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.5 | 5.3 | 7.6 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.2 | 4.1 | 5.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.4 | 4.2 | 5.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.9 | 3.2 | 4.1 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.4 | 4.1 | 5.0 | ns |
| T_{amb} = 25 °C; C_L = 15 pF | | | | | | |
| t _{pd} | propagation delay | see Figure 8 ^[2] | | | | |
| | | V _{CC} = 0.8 V | - | 27.4 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.6 | 7.2 | 14.1 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 5.1 | 8.1 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.2 | 4.3 | 6.3 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.0 | 3.7 | 4.9 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.0 | 3.5 | 4.4 | ns |
| t _{en} | enable time | see Figure 9 ^[3] | | | | |
| | | V _{CC} = 0.8 V | - | 79.2 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.6 | 7.8 | 15.8 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 5.4 | 8.8 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.1 | 4.3 | 6.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.8 | 3.4 | 4.8 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.6 | 3.1 | 4.3 | ns |

Table 8. Dynamic characteristics ...continuedVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

| Symbol | Parameter | Conditions | Min | Typ [1] | Max | Unit |
|---|-------------------|------------------------------------|-----|---------|------|------|
| t _{dis} | disable time | see Figure 9 [4] | | | | |
| | | V _{CC} = 0.8 V | - | 14.9 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.3 | 6.4 | 8.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 5.0 | 6.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 3.1 | 5.4 | 6.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.4 | 4.0 | 5.0 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 3.2 | 5.3 | 6.2 | ns |
| T_{amb} = 25 °C; C_L = 30 pF | | | | | | |
| t _{pd} | propagation delay | see Figure 8 [2] | | | | |
| | | V _{CC} = 0.8 V | - | 37.4 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.8 | 9.5 | 18.7 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 4.0 | 6.7 | 10.8 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.9 | 5.6 | 8.4 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.7 | 4.8 | 6.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.7 | 4.6 | 5.8 | ns |
| t _{en} | enable time | see Figure 9 [3] | | | | |
| | | V _{CC} = 0.8 V | - | 90.6 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.7 | 10.0 | 20.4 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 6.9 | 11.3 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.6 | 5.6 | 8.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.3 | 4.5 | 6.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.2 | 4.2 | 5.8 | ns |
| t _{dis} | disable time | see Figure 9 [4] | | | | |
| | | V _{CC} = 0.8 V | - | 51.6 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 6.0 | 9.8 | 13.6 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 4.5 | 7.7 | 10.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 5.2 | 8.8 | 11.4 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 3.9 | 6.4 | 7.4 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 5.5 | 9.0 | 10.7 | ns |

Table 8. Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

| Symbol | Parameter | Conditions | Min | Typ [1] | Max | Unit |
|--------------------------------|-------------------------------|--|-----|---------|-----|------|
| T_{amb} = 25 °C | | | | | | |
| C _{PD} | power dissipation capacitance | f = 1 MHz; V _I = GND to V _{CC} [5] | | | | |
| | | output enabled | | | | |
| | | V _{CC} = 0.8 V | - | 2.7 | - | pF |
| | | V _{CC} = 1.1 V to 1.3 V | - | 2.8 | - | pF |
| | | V _{CC} = 1.4 V to 1.6 V | - | 2.9 | - | pF |
| | | V _{CC} = 1.65 V to 1.95 V | - | 3.0 | - | pF |
| | | V _{CC} = 2.3 V to 2.7 V | - | 3.6 | - | pF |
| | | V _{CC} = 3.0 V to 3.6 V | - | 4.2 | - | pF |

- [1] All typical values are measured at nominal V_{CC}.
- [2] t_{pd} is the same as t_{PLH} and t_{PHL}.
- [3] t_{en} is the same as t_{PZH} and t_{PZL}.
- [4] t_{dis} is the same as t_{PHZ} and t_{PLZ}.
- [5] C_{PD} is used to determine the dynamic power dissipation (P_D 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_i = input frequency in MHz;
 f_o = output frequency in MHz;
 C_L = output load capacitance in pF;
 V_{CC} = supply voltage in V;
 N = number of inputs switching;
 Σ(C_L × V_{CC}² × f_o) = sum of the outputs.

Table 9. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------------------|-------------------|---|------------------|------|-------------------|------|------|
| | | | Min | Max | Min | Max | |
| C_L = 5 pF | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Figure 8 [1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 2.5 | 11.7 | 2.5 | 12.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.0 | 7.3 | 2.0 | 8.1 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.7 | 6.1 | 1.7 | 6.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.4 | 4.3 | 1.4 | 4.9 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.2 | 3.9 | 1.2 | 4.4 | ns |
| t _{en} | enable time | OE to Y; see Figure 9 [2] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 2.6 | 13.6 | 2.6 | 13.6 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.2 | 7.4 | 2.2 | 7.7 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.7 | 5.9 | 1.7 | 6.2 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.4 | 3.8 | 1.4 | 4.1 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.2 | 3.2 | 1.2 | 3.4 | ns |

Table 9. Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|------------------------------|-------------------|--|------------------|------|-------------------|------|------|
| | | | Min | Max | Min | Max | |
| t _{dis} | disable time | OE to Y; see Figure 9 ^[3] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 2.9 | 6.4 | 2.9 | 6.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.2 | 4.6 | 2.2 | 4.7 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.7 | 4.6 | 1.7 | 4.8 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.4 | 3.4 | 1.4 | 3.6 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.2 | 3.7 | 1.2 | 3.8 | ns |
| C_L = 10 pF | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Figure 8 ^[1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 3.0 | 13.8 | 3.0 | 15.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.9 | 8.5 | 1.9 | 9.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.7 | 6.8 | 1.7 | 7.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.6 | 5.3 | 1.6 | 5.9 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.6 | 4.6 | 1.6 | 5.2 | ns |
| t _{en} | enable time | OE to Y; see Figure 9 ^[2] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 3.0 | 15.4 | 3.0 | 15.4 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.1 | 8.3 | 2.1 | 8.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.7 | 6.5 | 1.7 | 6.8 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.4 | 4.5 | 1.4 | 4.8 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.3 | 3.8 | 1.3 | 4.0 | ns |
| t _{dis} | disable time | OE to Y; see Figure 9 ^[3] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 3.3 | 7.9 | 3.3 | 7.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.1 | 5.7 | 2.1 | 5.9 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.7 | 5.8 | 1.7 | 6.0 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.4 | 4.3 | 1.4 | 4.5 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.3 | 5.2 | 1.3 | 5.3 | ns |
| C_L = 15 pF | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Figure 8 ^[1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 3.3 | 15.8 | 3.3 | 17.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.5 | 9.8 | 2.5 | 10.9 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 7.9 | 2.0 | 8.8 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.8 | 6.0 | 1.8 | 6.7 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.8 | 5.4 | 1.8 | 6.1 | ns |
| t _{en} | enable time | OE to Y; see Figure 9 ^[2] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 3.3 | 17.1 | 3.3 | 17.1 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.9 | 9.4 | 2.9 | 9.7 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 7.3 | 2.0 | 7.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.7 | 5.2 | 1.7 | 5.6 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.5 | 4.5 | 1.5 | 4.7 | ns |

Table 9. Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

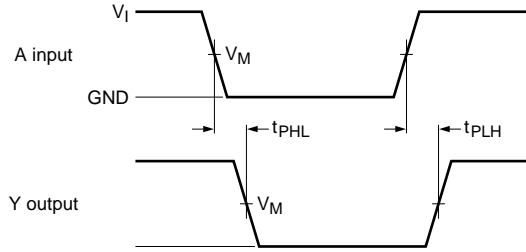
| Symbol | Parameter | Conditions | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|------------------------------|-------------------|---|------------------|------|-------------------|------|------|
| | | | Min | Max | Min | Max | |
| t _{dis} | disable time | OE to Y; see Figure 9 [3] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 3.7 | 9.3 | 3.7 | 9.4 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.5 | 6.9 | 2.5 | 7.0 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 7.4 | 2.0 | 7.5 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.7 | 5.1 | 1.7 | 5.5 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.5 | 6.7 | 1.5 | 6.9 | ns |
| C_L = 30 pF | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Figure 8 [1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 4.4 | 21.4 | 4.4 | 24.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 13.0 | 3.0 | 14.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.6 | 10.3 | 2.6 | 11.5 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.5 | 7.8 | 2.5 | 8.7 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.5 | 7.0 | 2.5 | 8.3 | ns |
| t _{en} | enable time | OE to Y; see Figure 9 [2] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 4.3 | 22.0 | 4.3 | 22.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.7 | 12.0 | 3.7 | 12.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 3.2 | 9.5 | 3.2 | 10.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.9 | 6.8 | 2.9 | 7.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.7 | 6.4 | 2.7 | 6.7 | ns |
| t _{dis} | disable time | OE to Y; see Figure 9 [3] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 4.7 | 14.3 | 4.7 | 14.4 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 10.7 | 3.0 | 11.0 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.6 | 11.5 | 2.6 | 11.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.3 | 9.0 | 2.3 | 10.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.2 | 10.8 | 2.2 | 12.0 | ns |

[1] t_{pd} is the same as t_{PLH} and t_{PHL}.

[2] t_{en} is the same as t_{PZH} and t_{PZL}.

[3] t_{dis} is the same as t_{PHZ} and t_{PLZ}.

12. Waveforms



001aad070

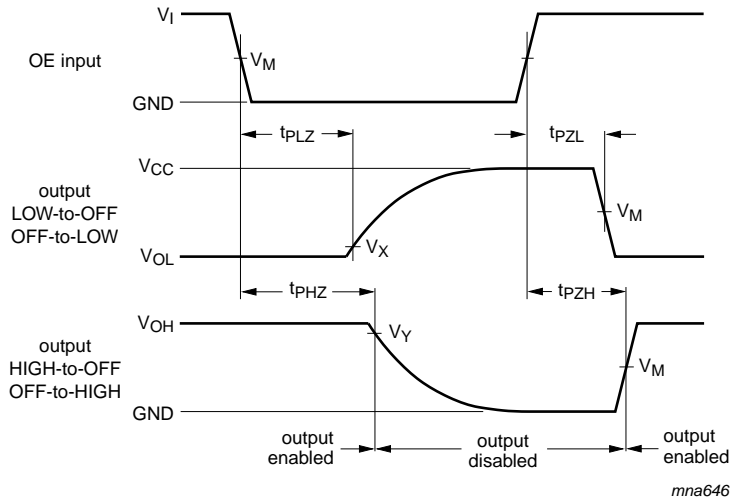
Measurement points are given in [Table 10](#).

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

Fig 8. The data input (A) to output (Y) propagation delays

Table 10. Measurement points

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



mna646

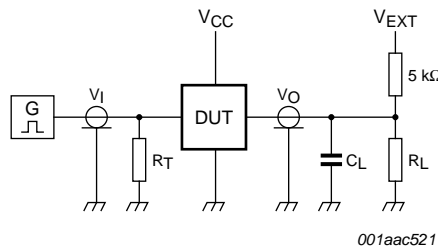
Measurement points are given in [Table 11](#).

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

Fig 9. Enable and disable times

Table 11. Measurement points

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



Test data is given in [Table 12](#).

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 10. Test circuit for measuring switching times

Table 12. 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

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

SOT353-1

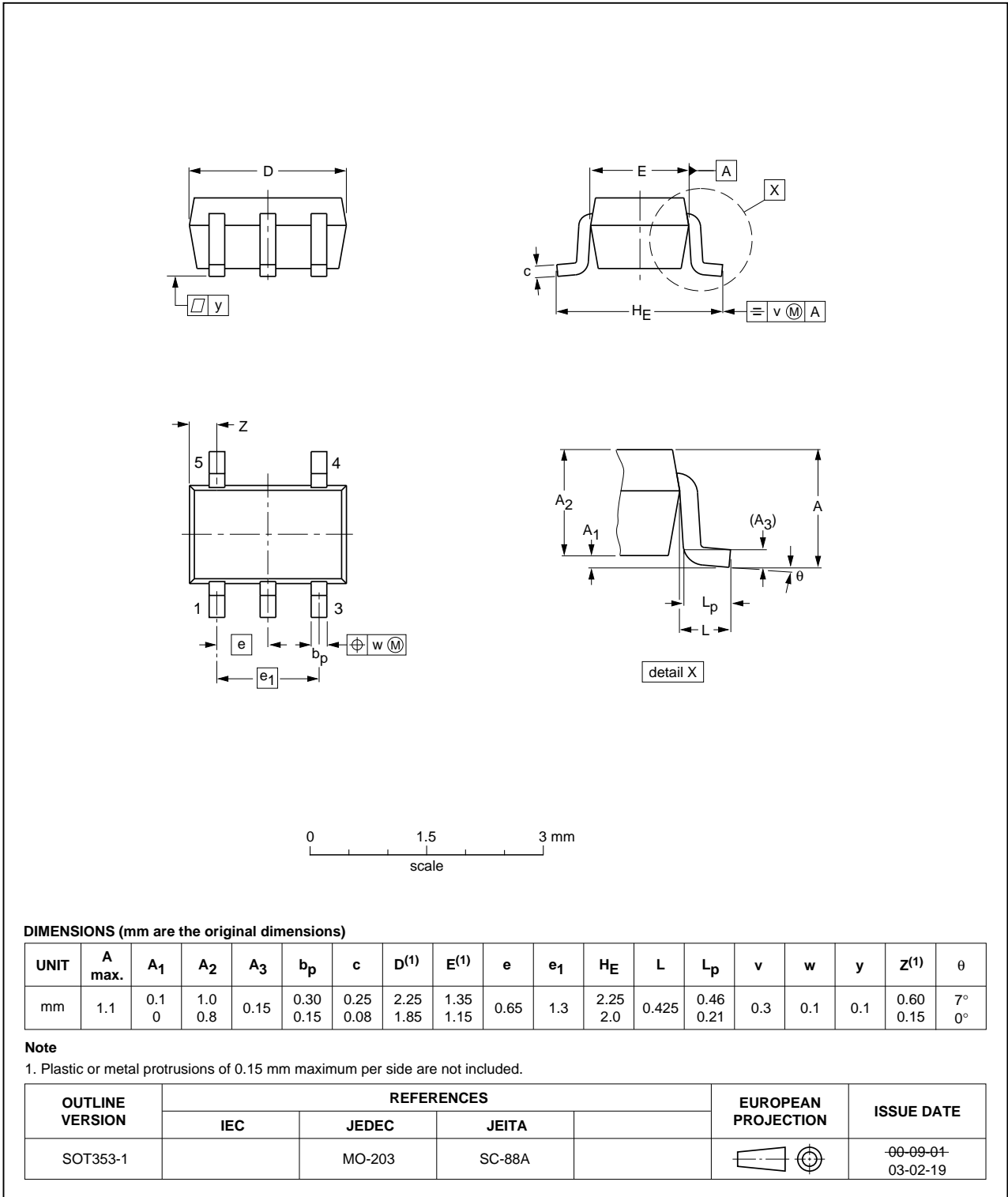


Fig 11. Package outline SOT353-1 (TSSOP5)

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

SOT886

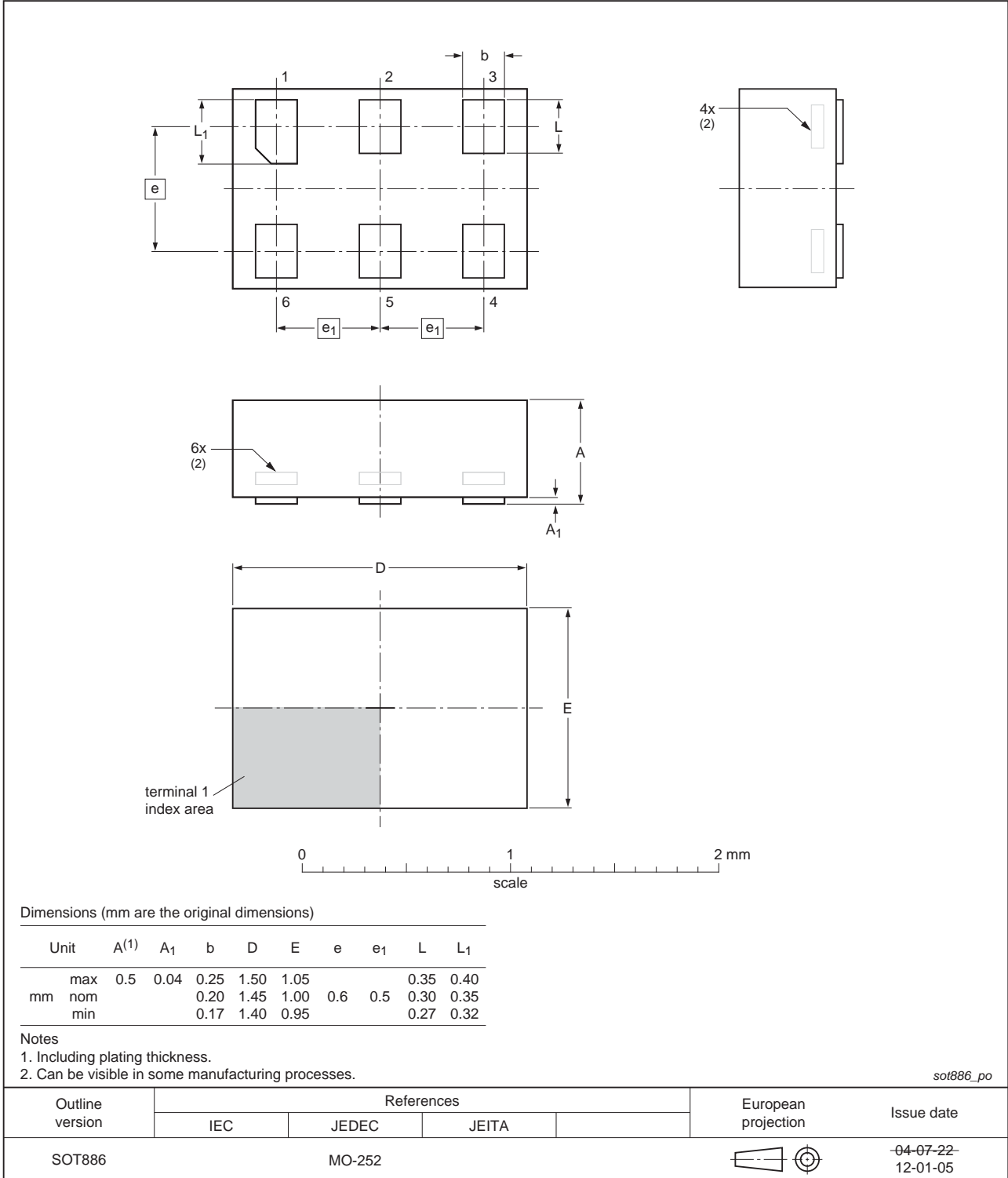


Fig 12. Package outline SOT886 (XSON6)

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

SOT891

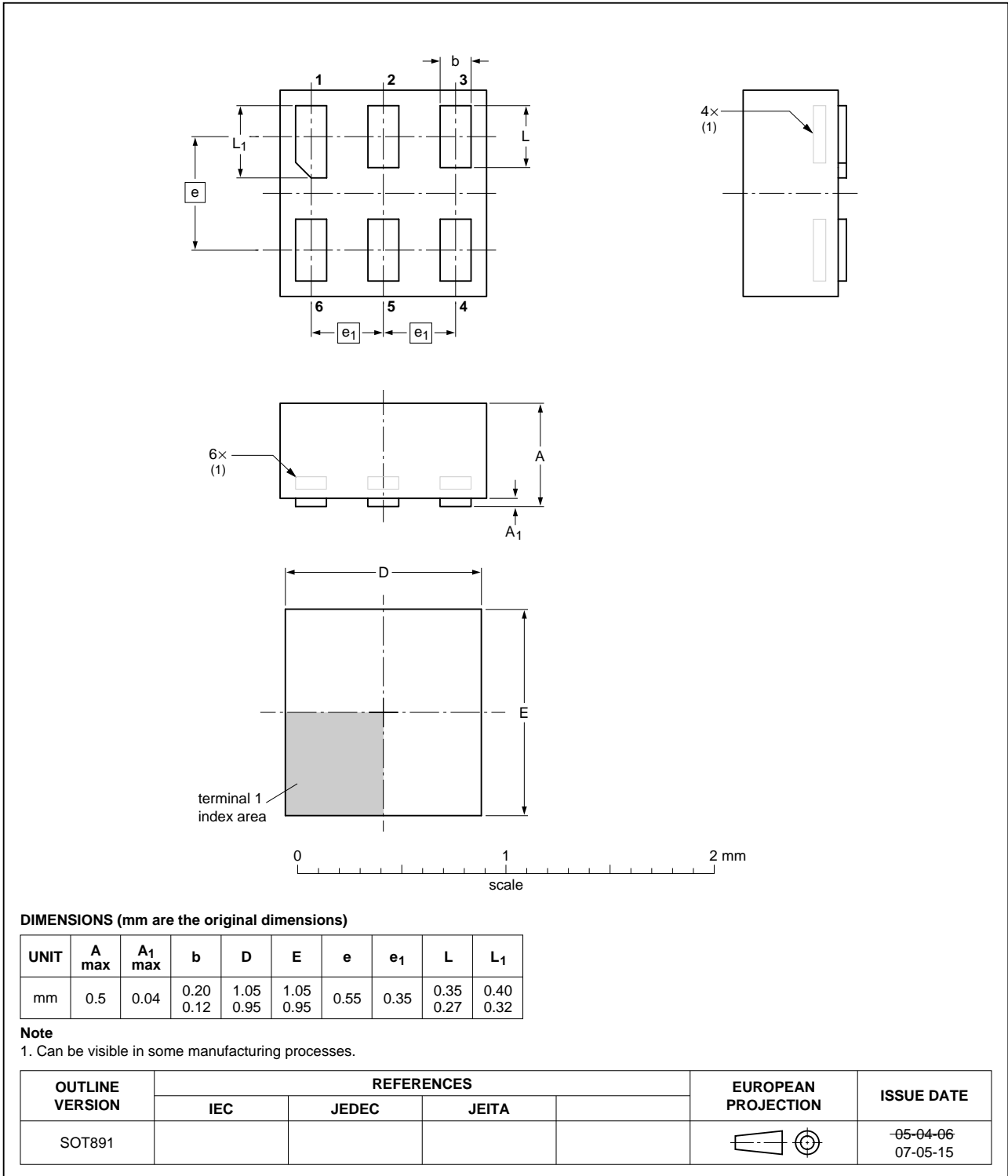


Fig 13. Package outline SOT891 (XSON6)

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

SOT1115

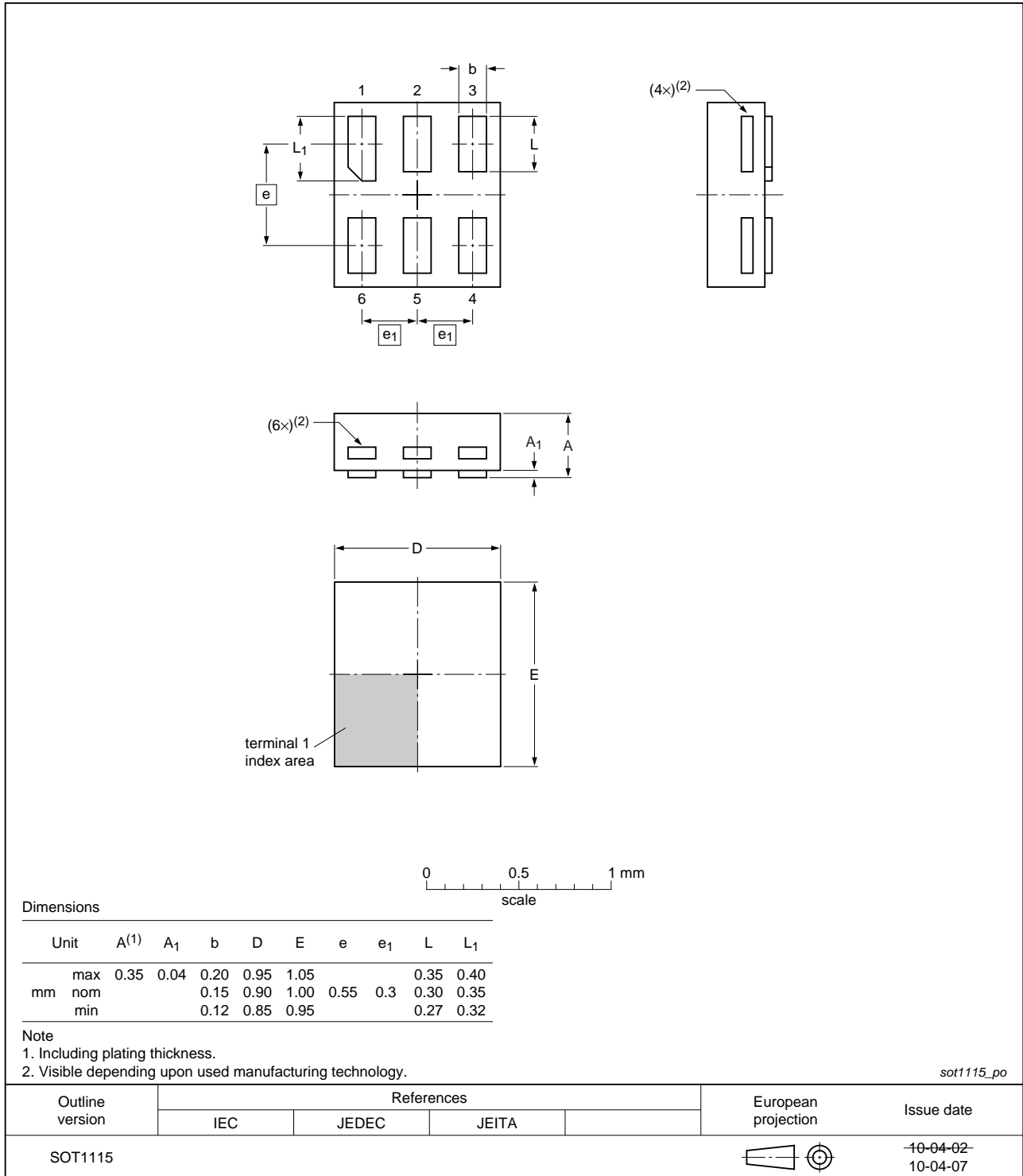


Fig 14. Package outline SOT1115 (XSON6)

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

SOT1202

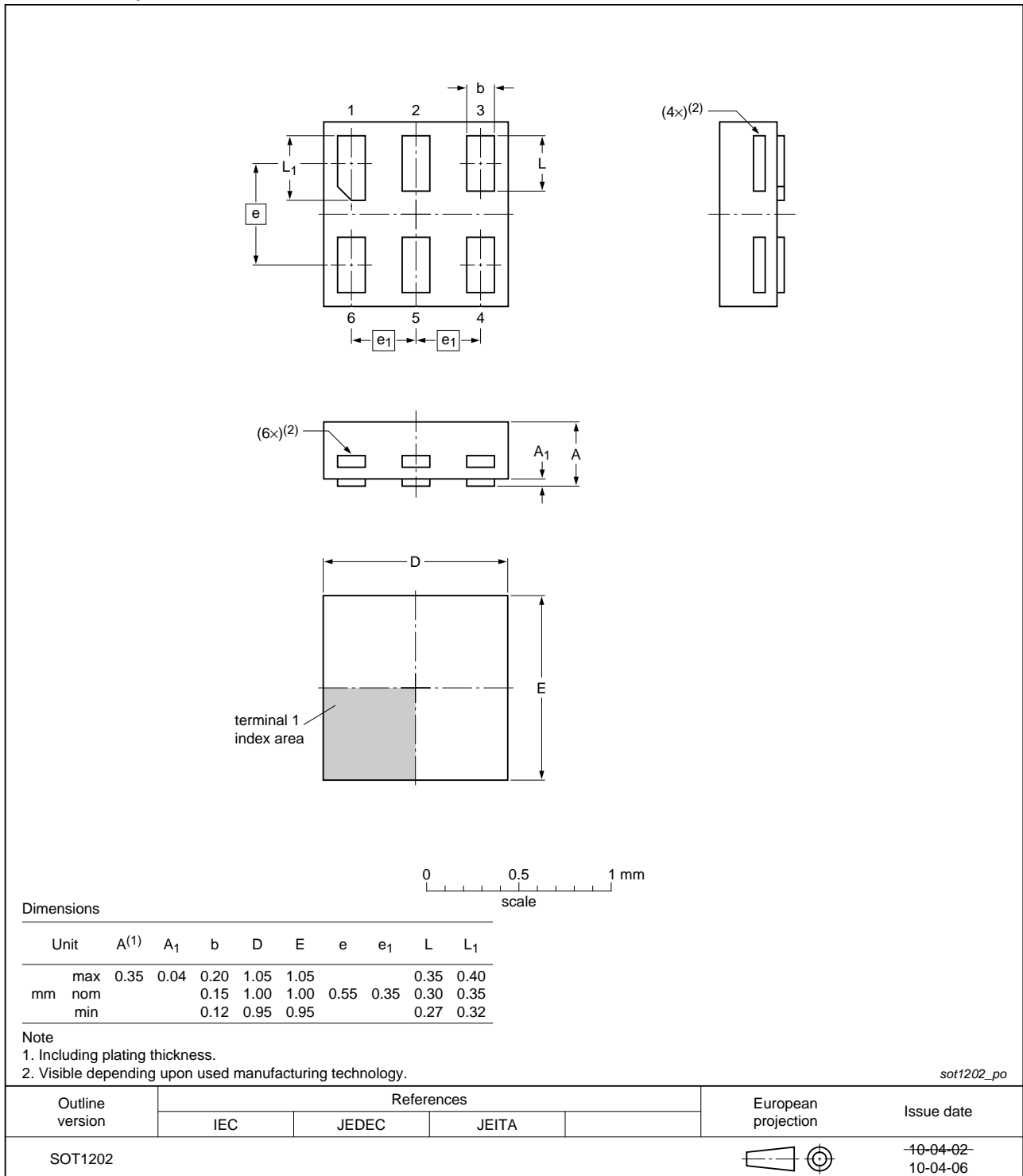


Fig 15. Package outline SOT1202 (XSON6)

X2SON5: plastic thermal enhanced extremely thin small outline package; no leads;
5 terminals; body 0.8 x 0.8 x 0.35 mm

SOT1226

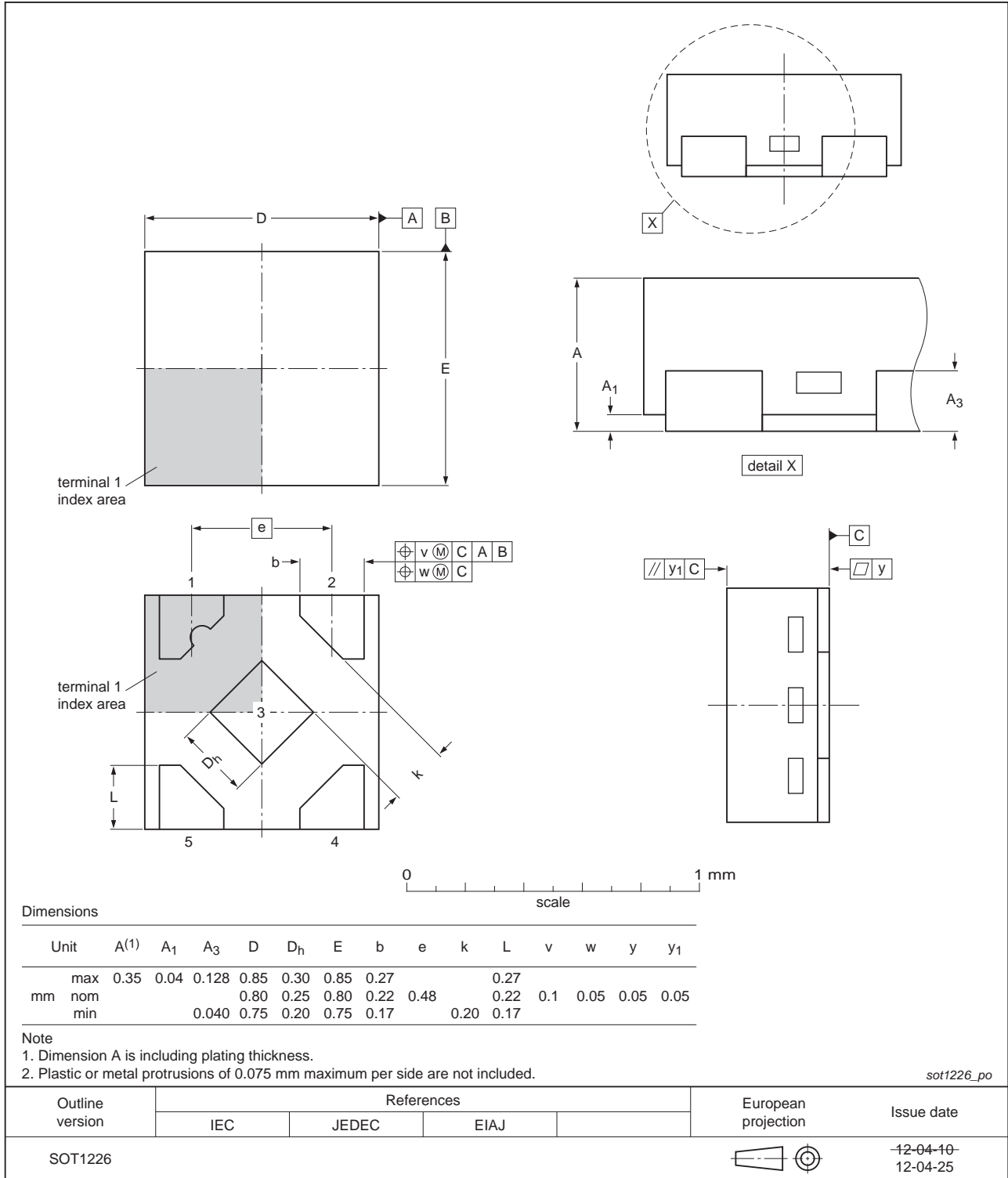


Fig 16. Package outline SOT1226 (X2SON5)

14. Abbreviations

Table 13. Abbreviations

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

15. Revision history

Table 14. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|--------------------|---------------|----------------|
| 74AUP1G126 v.5 | 20120628 | Product data sheet | - | 74AUP1G126 v.4 |
| Modifications: | <ul style="list-style-type: none"> Added type number 74AUP1G126GX (SOT1226) Package outline drawing of SOT886 (Figure 12) modified. | | | |
| 74AUP1G126 v.4 | 20111124 | Product data sheet | - | 74AUP1G126 v.3 |
| Modifications: | <ul style="list-style-type: none"> Legal pages updated. | | | |
| 74AUP1G126 v.3 | 20100903 | Product data sheet | - | 74AUP1G126 v.2 |
| 74AUP1G126 v.2 | 20060628 | Product data sheet | - | 74AUP1G126 v.1 |
| 74AUP1G126 v.1 | 20050725 | Product data sheet | - | - |

16. Legal information

16.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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