

74AUP2G132

Low-power dual 2-input NAND Schmitt trigger

Rev. 10 — 23 January 2023

Product data sheet

1. General description

The 74AUP2G132 is a dual 2-input NAND gate with Schmitt-trigger inputs. This device ensures very low static and dynamic power consumption across the entire V_{CC} range from 0.8 V to 3.6 V. This device is fully specified for partial power down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

2. Features and benefits

- Wide supply voltage range from 0.8 V to 3.6 V
- CMOS low power dissipation
- High noise immunity
- Low static power consumption; $I_{CC} = 0.9 \mu\text{A}$ (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Overvoltage tolerant inputs to 3.6 V
- Low noise overshoot and undershoot < 10 % of V_{CC}
- I_{OFF} circuitry provides partial Power-down mode operation
- Complies with JEDEC standards:
 - JESD8-12 (0.8 V to 1.3 V)
 - JESD8-11 (0.9 V to 1.65 V)
 - JESD8-7 (1.65 V to 1.95 V)
 - JESD8-5 (2.3 V to 2.7 V)
 - JESD8C (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
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

3. Applications

- Wave and pulse shaper
- Astable multivibrator
- Monostable multivibrator

4. Ordering information

Table 1. Ordering information

| Type number | Package | | | Version |
|------------------------------|-------------------|--------|---|---------------------------|
| | Temperature range | Name | Description | |
| 74AUP2G132DC | -40 °C to +125 °C | VSSOP8 | plastic very thin shrink small outline package; 8 leads; body width 2.3 mm | SOT765-1 |
| 74AUP2G132GT | -40 °C to +125 °C | XSON8 | plastic extremely thin small outline package; no leads; 8 terminals; body 1 × 1.95 × 0.5 mm | SOT833-1 |
| 74AUP2G132GF | -40 °C to +125 °C | XSON8 | extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1 × 0.5 mm | SOT1089 |
| 74AUP2G132GN | -40 °C to +125 °C | XSON8 | extremely thin small outline package; no leads; 8 terminals; body 1.2 × 1.0 × 0.35 mm | SOT1116 |
| 74AUP2G132GS | -40 °C to +125 °C | XSON8 | extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1.0 × 0.35 mm | SOT1203 |
| 74AUP2G132GX | -40 °C to +125 °C | X2SON8 | plastic thermal enhanced extremely thin small outline package; no leads; 8 terminals; body 1.35 × 0.8 × 0.32 mm | SOT1233-2 |

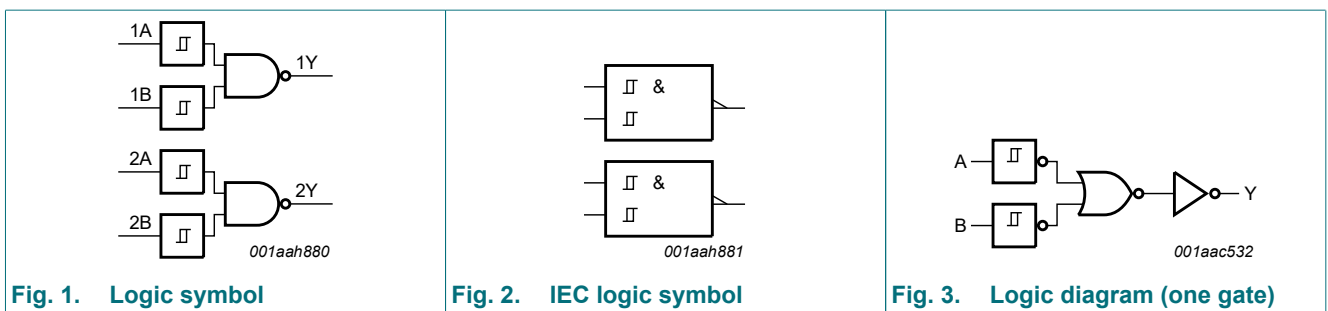
5. Marking

Table 2. Marking codes

| Type number | Marking code ^[1] |
|--------------|-----------------------------|
| 74AUP2G132DC | aE2 |
| 74AUP2G132GT | aE2 |
| 74AUP2G132GF | aE |
| 74AUP2G132GN | aE |
| 74AUP2G132GS | aE |
| 74AUP2G132GX | aE |

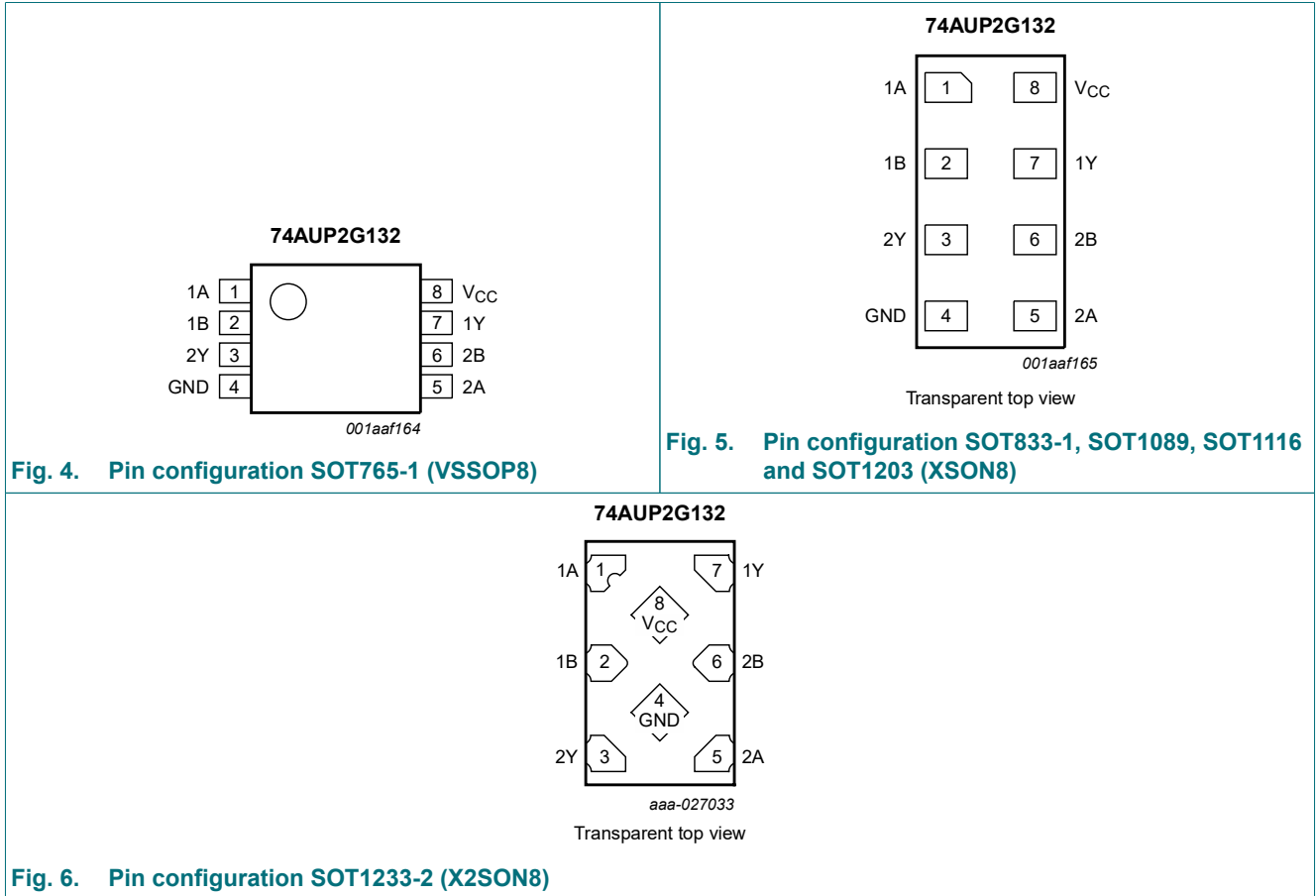
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

6. Functional diagram



7. Pinning information

7.1. Pinning



7.2. Pin description

Table 3. Pin description

| Symbol | Pin | Description |
|-----------------|------|----------------|
| 1A, 2A | 1, 5 | data input |
| 1B, 2B | 2, 6 | data input |
| GND | 4 | ground (0 V) |
| 1Y, 2Y | 7, 3 | data output |
| V _{CC} | 8 | supply voltage |

8. Functional description

Table 4. Function table

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

| Input | | Output |
|-------|----|--------|
| nA | nB | nY |
| L | L | H |
| L | H | H |
| H | L | H |
| H | H | L |

9. 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 | $V_I < 0\text{ V}$ | -50 | - | mA |
| V_I | input voltage | | [1] | +4.6 | V |
| I_{OK} | output clamping current | $V_O < 0\text{ V}$ | -50 | - | mA |
| V_O | output voltage | Active mode and Power-down mode | [1] | +4.6 | V |
| I_O | output current | $V_O = 0\text{ V to }V_{CC}$ | - | ± 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 | $T_{amb} = -40\text{ °C to }+125\text{ °C}$ | | | |
| | | SOT765-1 (VSSOP8) | [2] | 250 | mW |
| | | SOT833-1 (XSON8) | [3] | 250 | mW |
| | | SOT1089 (XSON8) | [4] | 250 | mW |
| | | SOT1116 (XSON8) | [5] | 250 | mW |
| | | SOT1203 (XSON8) | [6] | 250 | mW |
| | | SOT1233-2 (X2SON8) | [7] | 300 | mW |

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

[2] For SOT765-1 (VSSOP8) package: P_{tot} derates linearly with 4.9 mW/K above 99 °C.

[3] For SOT833-1 (XSON8) package: P_{tot} derates linearly with 3.1 mW/K above 68 °C.

[4] For SOT1089 (XSON8) package: P_{tot} derates linearly with 4.0 mW/K above 88 °C.

[5] For SOT1116 (XSON8) package: P_{tot} derates linearly with 4.2 mW/K above 90 °C.

[6] For SOT1203 (XSON8) package: P_{tot} derates linearly with 3.6 mW/K above 81 °C.

[7] For SOT1233-2 (X2SON8) package: P_{tot} derates linearly with 7.7 mW/K above 118 °C.

10. 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 |

11. 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_{OH} | HIGH-level output voltage | $V_I = V_{T+}$ or V_{T-} | | | | |
| | | $I_O = -20$ 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 | $0.75 \times V_{CC}$ | - | - | 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 | $V_I = V_{T+}$ or V_{T-} | | | | |
| | | $I_O = 20$ 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 | - | - | 0.31 | 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 | μ A |
| | | V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V | - | - | ± 0.2 | μ A |
| 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 | 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 | - | - | 0.5 | μ A |
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V | - | - | 40 | μ A |
| C_I | input capacitance | $V_I = GND$ or V_{CC} ; $V_{CC} = 0$ V to 3.6 V | - | 1.1 | - | pF |
| C_O | output capacitance | $V_O = GND$; $V_{CC} = 0$ V | - | 1.7 | - | pF |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|--------------------------------------|---|-----------------------|-----|-----------------------|------|
| T_{amb} = -40 °C to +85 °C | | | | | | |
| V _{OH} | HIGH-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | 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 | 0.7 × 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 |
| | | I _O = -4.0 mA; V _{CC} = 3.0 V | 2.55 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | 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 | - | - | 0.37 | 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 _O = 4.0 mA; V _{CC} = 3.0 V | - | - | 0.45 | V |
| I _I | input leakage current | V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V | - | - | ±0.5 | μA |
| I _{OFF} | power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V | - | - | ±0.5 | 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 | - | - | ±0.6 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V | - | - | 0.9 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | [1] | - | 50 | μA |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|--------------------------------------|--|------------------------|-----|------------------------|------|
| T_{amb} = -40 °C to +125 °C | | | | | | |
| V _{OH} | HIGH-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = -20 μA; 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 × 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 |
| I _O = -4.0 mA; V _{CC} = 3.0 V | 2.30 | - | - | V | | |
| V _{OL} | LOW-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = 20 μA; V _{CC} = 0.8 V to 3.6 V | - | - | 0.11 | V |
| | | I _O = 1.1 mA; V _{CC} = 1.1 V | - | - | 0.33 × 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 _O = 4.0 mA; V _{CC} = 3.0 V | - | - | 0.50 | V | | |
| I _I | input leakage current | V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V | - | - | ±0.75 | μA |
| I _{OFF} | power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V | - | - | ±0.75 | 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 | - | - | ±0.75 | 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 | V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | [1] | - | 75 | μA |

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

12. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 8.

| Symbol | Parameter | Conditions | T _{amb} = 25 °C | | | T _{amb} = -40 °C to +85 °C | | T _{amb} = -40 °C to +125 °C | | Unit |
|-----------------------------|-------------------|------------------------------------|--------------------------|--------|------|-------------------------------------|------|--------------------------------------|------|------|
| | | | Min | Typ[1] | Max | Min | Max | Min | Max | |
| C_L = 5 pF | | | | | | | | | | |
| t _{pd} | propagation delay | nA or nB to nY; see Fig. 7 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 22.5 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.6 | 6.3 | 13.4 | 2.4 | 15.1 | 2.4 | 16.6 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.2 | 4.6 | 8.2 | 1.9 | 9.7 | 1.9 | 10.7 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.9 | 3.9 | 6.6 | 1.7 | 7.9 | 1.7 | 8.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.7 | 3.2 | 5.3 | 1.5 | 6.2 | 1.5 | 6.8 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.6 | 2.9 | 4.7 | 1.4 | 5.6 | 1.4 | 6.2 | ns |

Low-power dual 2-input NAND Schmitt trigger

| Symbol | Parameter | Conditions | T _{amb} = 25 °C | | | T _{amb} = -40 °C to +85 °C | | T _{amb} = -40 °C to +125 °C | | Unit |
|---|-------------------------------|---|--------------------------|--------|------|-------------------------------------|------|--------------------------------------|------|------|
| | | | Min | Typ[1] | Max | Min | Max | Min | Max | |
| C_L = 10 pF | | | | | | | | | | |
| t _{pd} | propagation delay | nA or nB to nY; see Fig. 7 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 26.1 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.0 | 7.2 | 15.4 | 2.7 | 17.3 | 2.7 | 19.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.5 | 5.2 | 9.3 | 2.2 | 11.0 | 2.2 | 12.1 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.3 | 4.5 | 7.5 | 2.0 | 9.0 | 2.0 | 9.9 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.1 | 3.8 | 6.1 | 1.8 | 7.2 | 1.8 | 7.9 | ns |
| C_L = 15 pF | | | | | | | | | | |
| t _{pd} | propagation delay | nA or nB to nY; see Fig. 7 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 29.6 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.3 | 8.0 | 17.2 | 3.0 | 19.4 | 3.0 | 21.3 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.8 | 5.8 | 10.4 | 2.5 | 12.3 | 2.5 | 13.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.6 | 5.0 | 8.3 | 2.3 | 10.0 | 2.3 | 11.0 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.3 | 4.2 | 6.7 | 2.1 | 7.9 | 2.1 | 8.7 | ns |
| C_L = 30 pF | | | | | | | | | | |
| t _{pd} | propagation delay | nA or nB to nY; see Fig. 7 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 39.9 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.3 | 10.2 | 22.6 | 3.8 | 25.4 | 3.8 | 27.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.6 | 7.3 | 13.3 | 3.2 | 15.8 | 3.2 | 17.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 3.2 | 6.3 | 10.6 | 2.9 | 12.8 | 2.9 | 14.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 3.0 | 5.3 | 8.5 | 2.7 | 10.1 | 2.7 | 11.1 | ns |
| C_L = 5 pF, 10 pF, 15 pF and 30 pF | | | | | | | | | | |
| C _{PD} | power dissipation capacitance | f _i = 1 MHz; V _I = GND to V _{CC} [3] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 2.6 | - | - | - | - | - | pF |
| | | V _{CC} = 1.1 V to 1.3 V | - | 2.9 | - | - | - | - | - | pF |
| | | V _{CC} = 1.4 V to 1.6 V | - | 3.0 | - | - | - | - | - | pF |
| | | V _{CC} = 1.65 V to 1.95 V | - | 3.2 | - | - | - | - | - | pF |
| | | V _{CC} = 2.3 V to 2.7 V | - | 3.8 | - | - | - | - | - | pF |
| C_L = 5 pF, 10 pF, 15 pF and 30 pF | | | | | | | | | | |
| C _{PD} | power dissipation capacitance | V _{CC} = 3.0 V to 3.6 V | - | 4.4 | - | - | - | - | - | pF |

- [1] All typical values are measured at nominal V_{CC}.
- [2] t_{pd} is the same as t_{PLH} and t_{PHL}.
- [3] 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.

12.1. Waveforms and test circuit

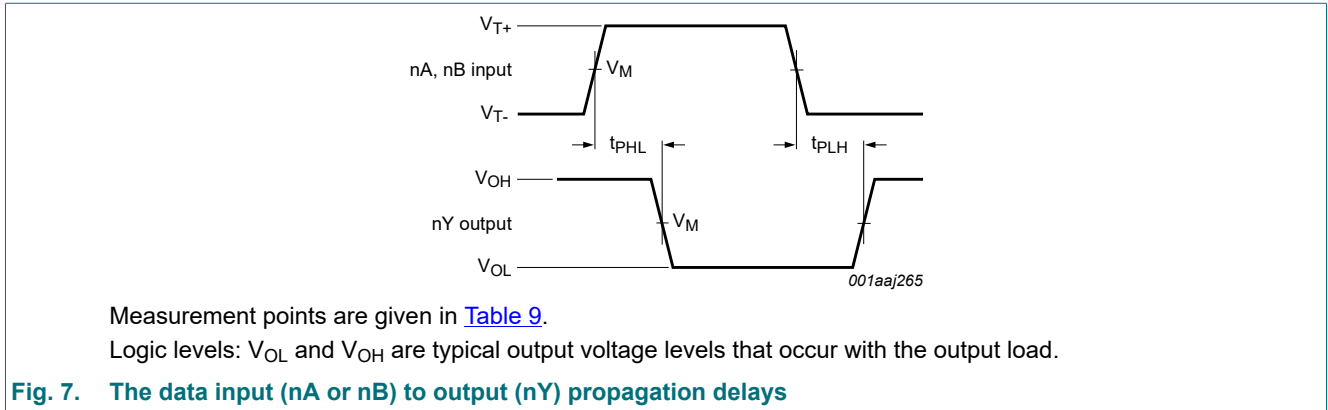


Table 9. Measurement points

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

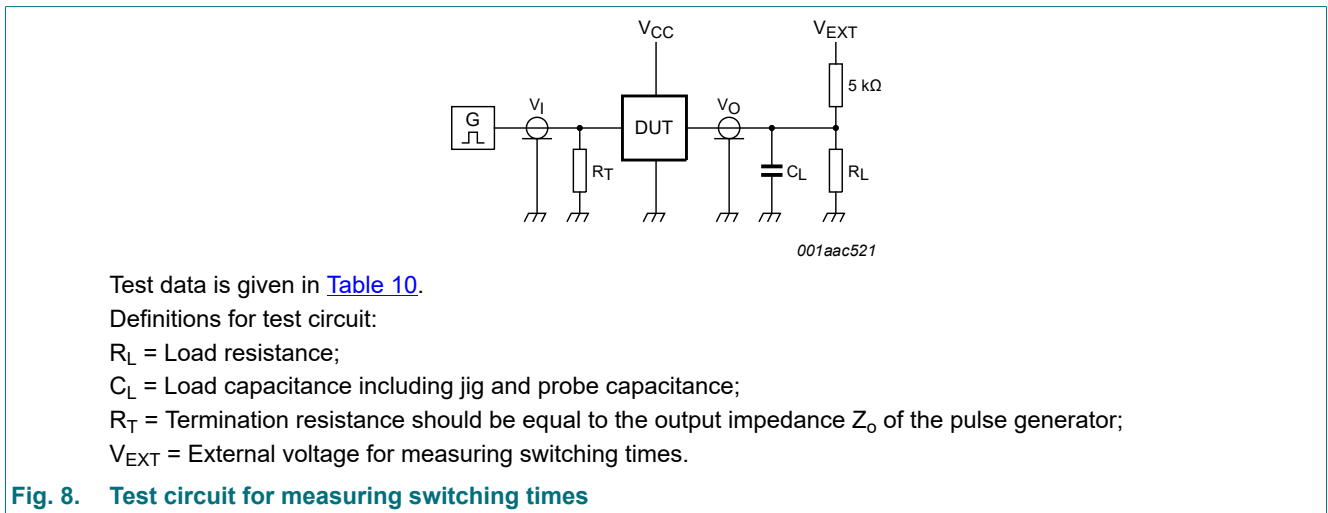


Table 10. Test data

| 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 $R_L = 5$ kΩ.
 For measuring propagation delays, setup and hold times and pulse width $R_L = 1$ MΩ.

13. Transfer characteristics

Table 11. Transfer characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 8.

| Symbol | Parameter | Conditions | T _{amb} = 25 °C | | | T _{amb} = -40 °C to +85 °C | | T _{amb} = -40 °C to +125 °C | | Unit |
|-----------------|----------------------------------|--|--------------------------|-----|------|-------------------------------------|------|--------------------------------------|------|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| V _{T+} | positive-going threshold voltage | see Fig. 9 and Fig. 10 | | | | | | | | |
| | | V _{CC} = 0.8 V | 0.30 | - | 0.60 | 0.30 | 0.60 | 0.30 | 0.62 | V |
| | | V _{CC} = 1.1 V | 0.53 | - | 0.90 | 0.53 | 0.90 | 0.53 | 0.92 | V |
| | | V _{CC} = 1.4 V | 0.74 | - | 1.11 | 0.74 | 1.11 | 0.74 | 1.13 | V |
| | | V _{CC} = 1.65 V | 0.91 | - | 1.29 | 0.91 | 1.29 | 0.91 | 1.31 | V |
| | | V _{CC} = 2.3 V | 1.37 | - | 1.77 | 1.37 | 1.77 | 1.37 | 1.80 | V |
| V _{T-} | negative-going threshold voltage | see Fig. 9 and Fig. 10 | | | | | | | | |
| | | V _{CC} = 0.8 V | 0.10 | - | 0.60 | 0.10 | 0.60 | 0.10 | 0.60 | V |
| | | V _{CC} = 1.1 V | 0.26 | - | 0.65 | 0.26 | 0.65 | 0.26 | 0.65 | V |
| | | V _{CC} = 1.4 V | 0.39 | - | 0.75 | 0.39 | 0.75 | 0.39 | 0.75 | V |
| | | V _{CC} = 1.65 V | 0.47 | - | 0.84 | 0.47 | 0.84 | 0.47 | 0.84 | V |
| | | V _{CC} = 2.3 V | 0.69 | - | 1.04 | 0.69 | 1.04 | 0.69 | 1.04 | V |
| V _H | hysteresis voltage | (V _{T+} - V _{T-}); see Fig. 9, Fig. 10, Fig. 11 and Fig. 12 | | | | | | | | |
| | | V _{CC} = 0.8 V | 0.07 | - | 0.50 | 0.07 | 0.50 | 0.07 | 0.50 | V |
| | | V _{CC} = 1.1 V | 0.08 | - | 0.46 | 0.08 | 0.46 | 0.08 | 0.46 | V |
| | | V _{CC} = 1.4 V | 0.18 | - | 0.56 | 0.18 | 0.56 | 0.18 | 0.56 | V |
| | | V _{CC} = 1.65 V | 0.27 | - | 0.66 | 0.27 | 0.66 | 0.27 | 0.66 | V |
| | | V _{CC} = 2.3 V | 0.53 | - | 0.92 | 0.53 | 0.92 | 0.53 | 0.92 | V |
| | | V _{CC} = 3.0 V | 0.79 | - | 1.31 | 0.79 | 1.31 | 0.79 | 1.31 | V |

13.1. Waveforms transfer characteristics

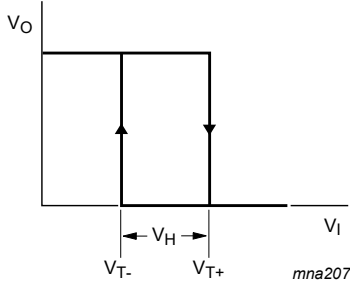


Fig. 9. Transfer characteristic

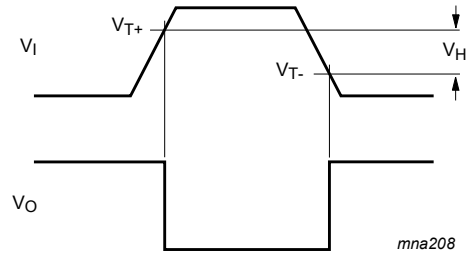


Fig. 10. Definition of V_{T+} , V_{T-} and V_H

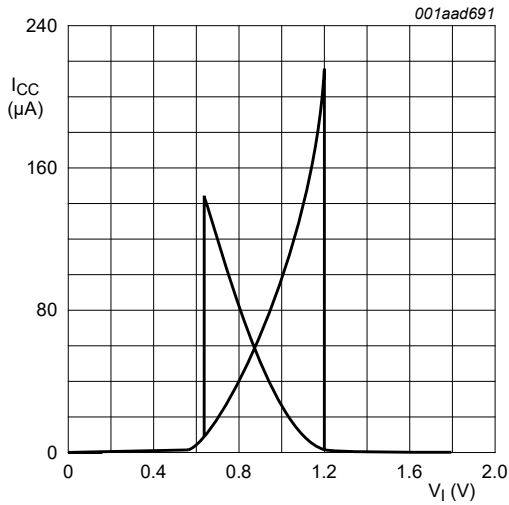


Fig. 11. Typical transfer characteristics; $V_{CC} = 1.8\text{ V}$

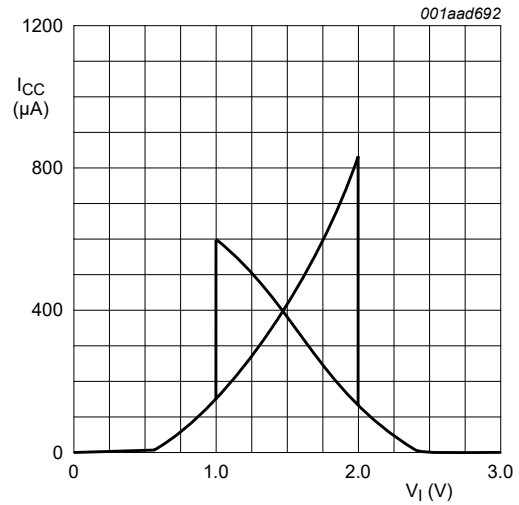


Fig. 12. Typical transfer characteristics; $V_{CC} = 3.0\text{ V}$

14. Application information

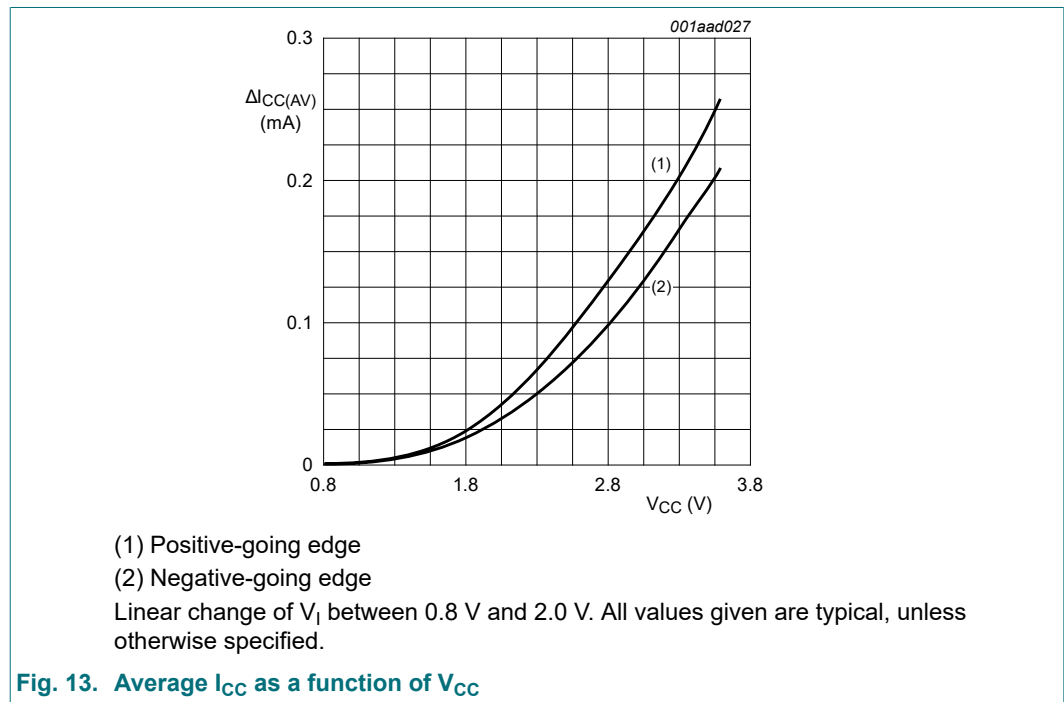
The slow input rise and fall times cause additional power dissipation which can be calculated using the following formula:

$$P_{\text{add}} = f_i \times (t_r \times \Delta I_{\text{CC(AV)}} + t_f \times \Delta I_{\text{CC(AV)}}) \times V_{\text{CC}}$$

where:

- P_{add} = additional power dissipation (μW);
- f_i = input frequency (MHz);
- t_r = input rise time (ns); 10 % to 90 %;
- t_f = input fall time (ns); 90 % to 10 %;
- $\Delta I_{\text{CC(AV)}}$ = average additional supply current (μA).

Average $\Delta I_{\text{CC(AV)}}$ differs with positive or negative input transitions, as shown in [Fig. 13](#).



15. Package outline

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

SOT765-1

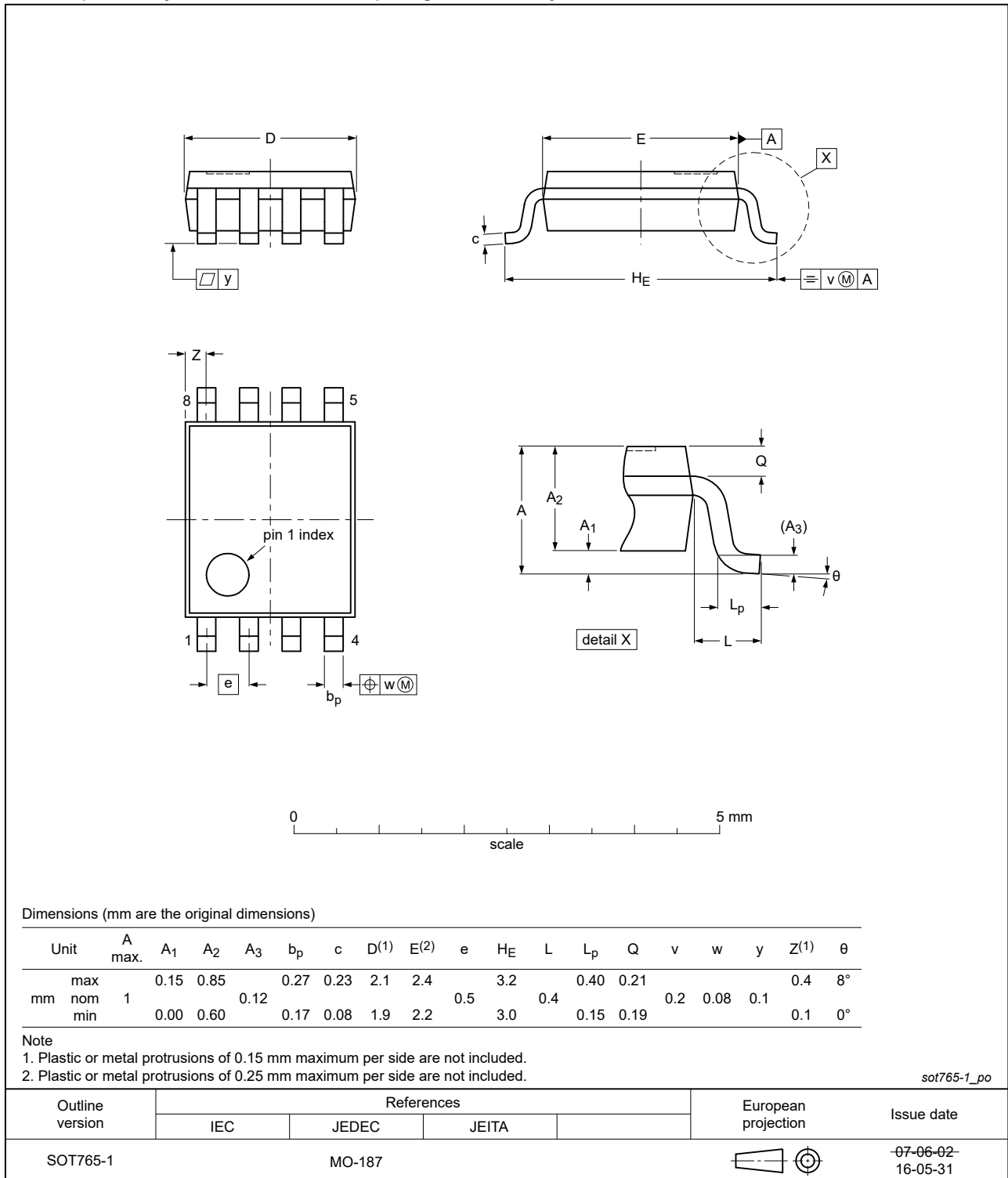


Fig. 14. Package outline SOT765-1 (VSSOP8)

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

SOT833-1

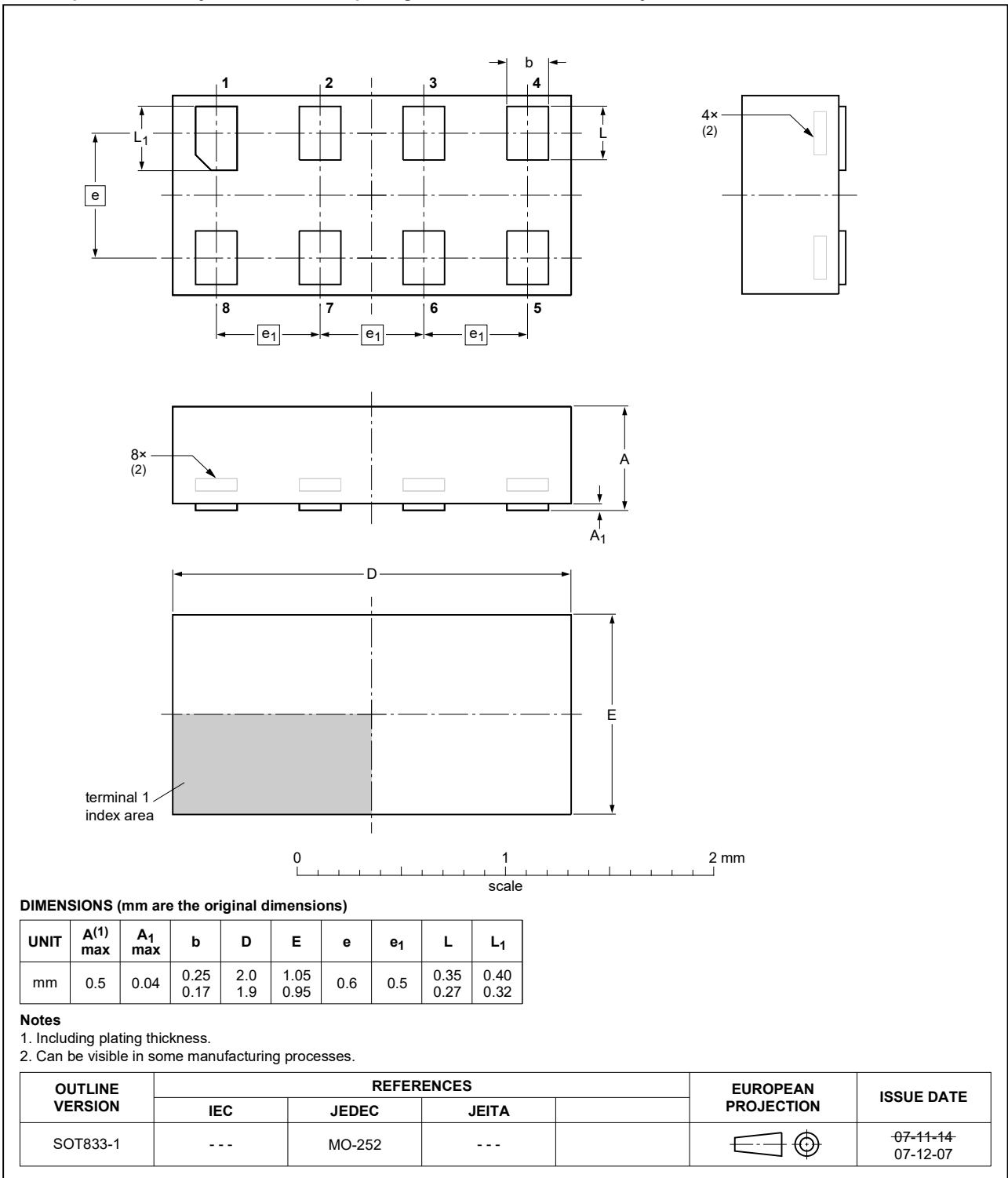


Fig. 15. Package outline SOT833-1 (XSON8)

XSON8: extremely thin small outline package; no leads;
8 terminals; body 1.35 x 1 x 0.5 mm

SOT1089

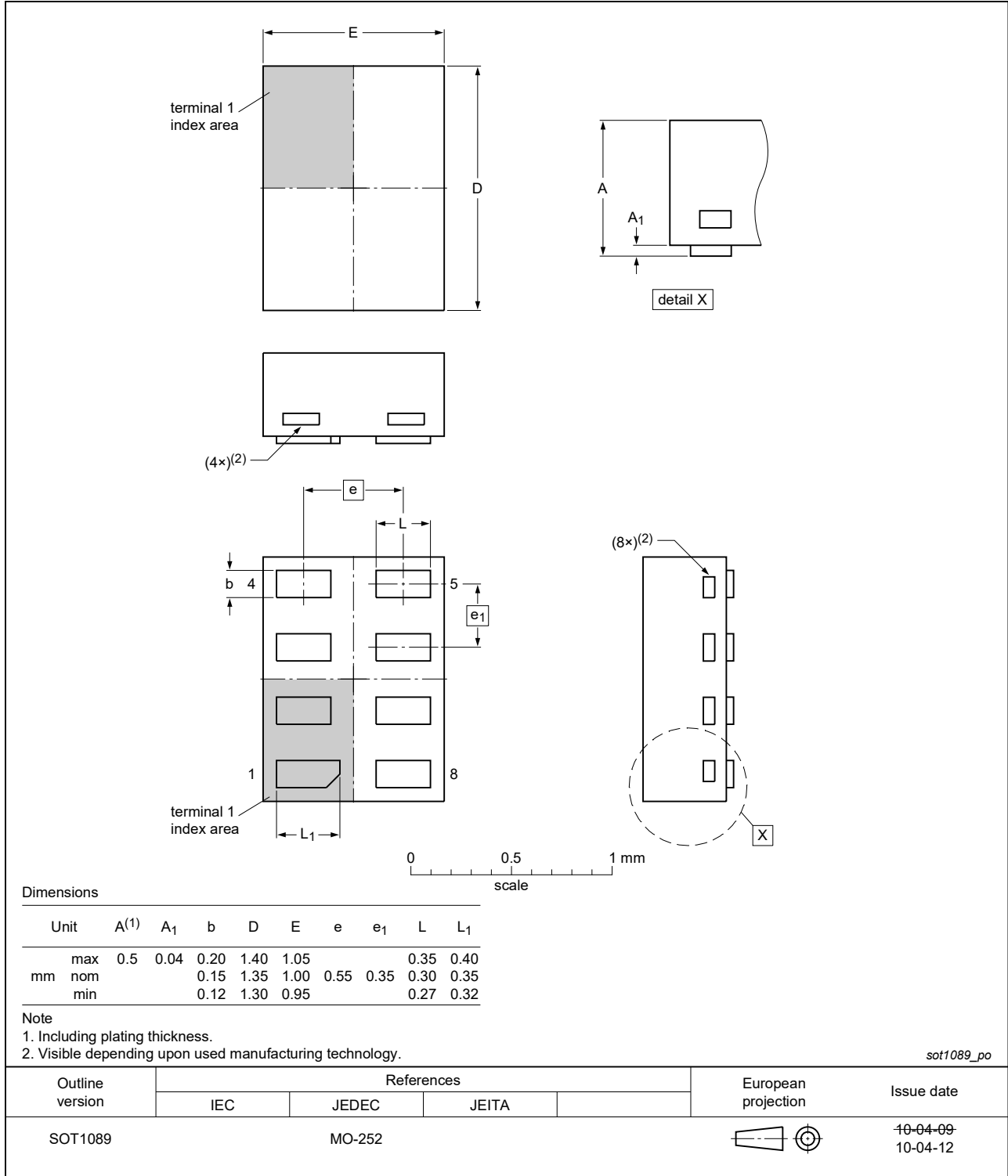


Fig. 16. Package outline SOT1089 (XSON8)

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

SOT1116

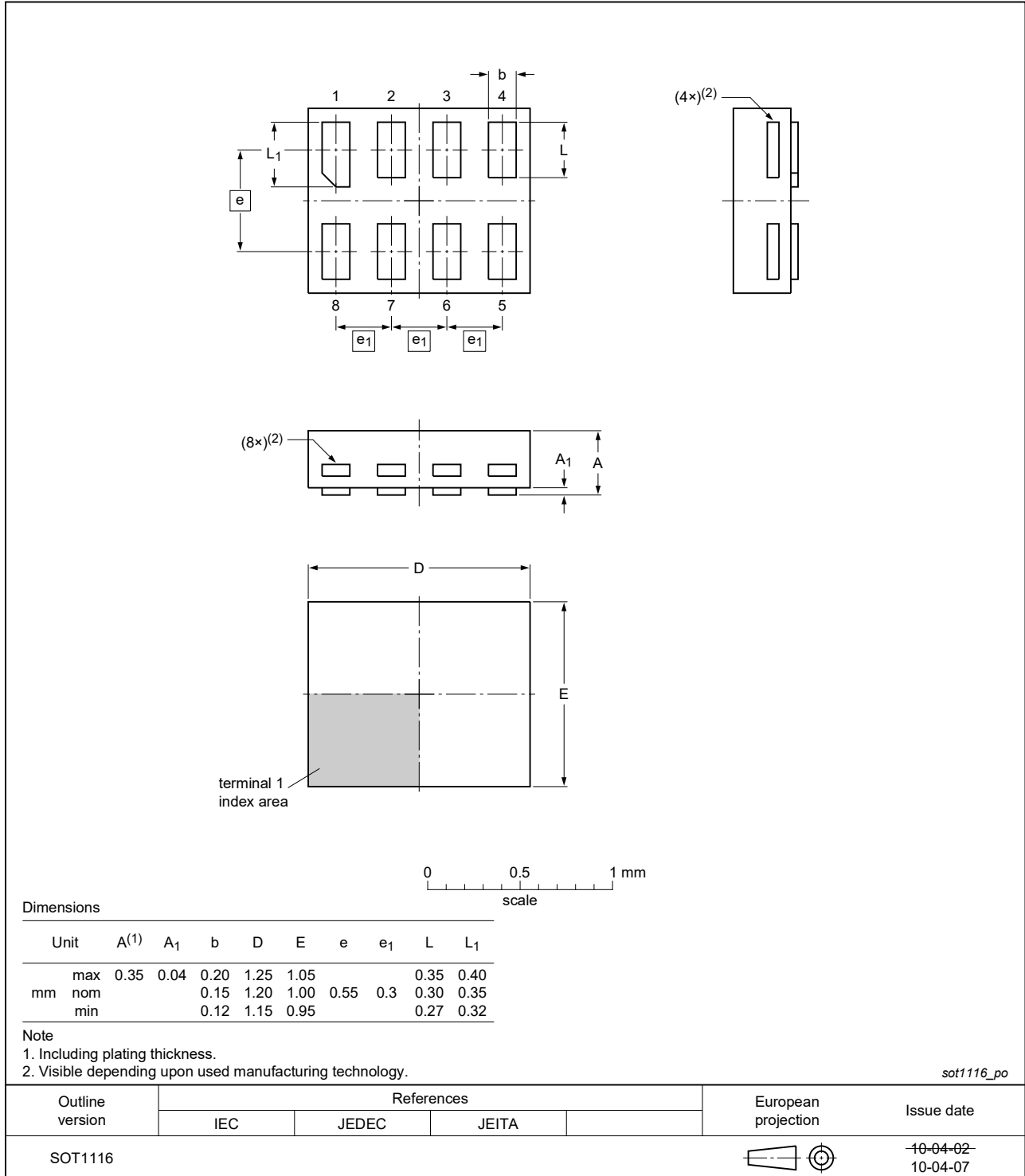


Fig. 17. Package outline SOT1116 (XSON8)

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

SOT1203

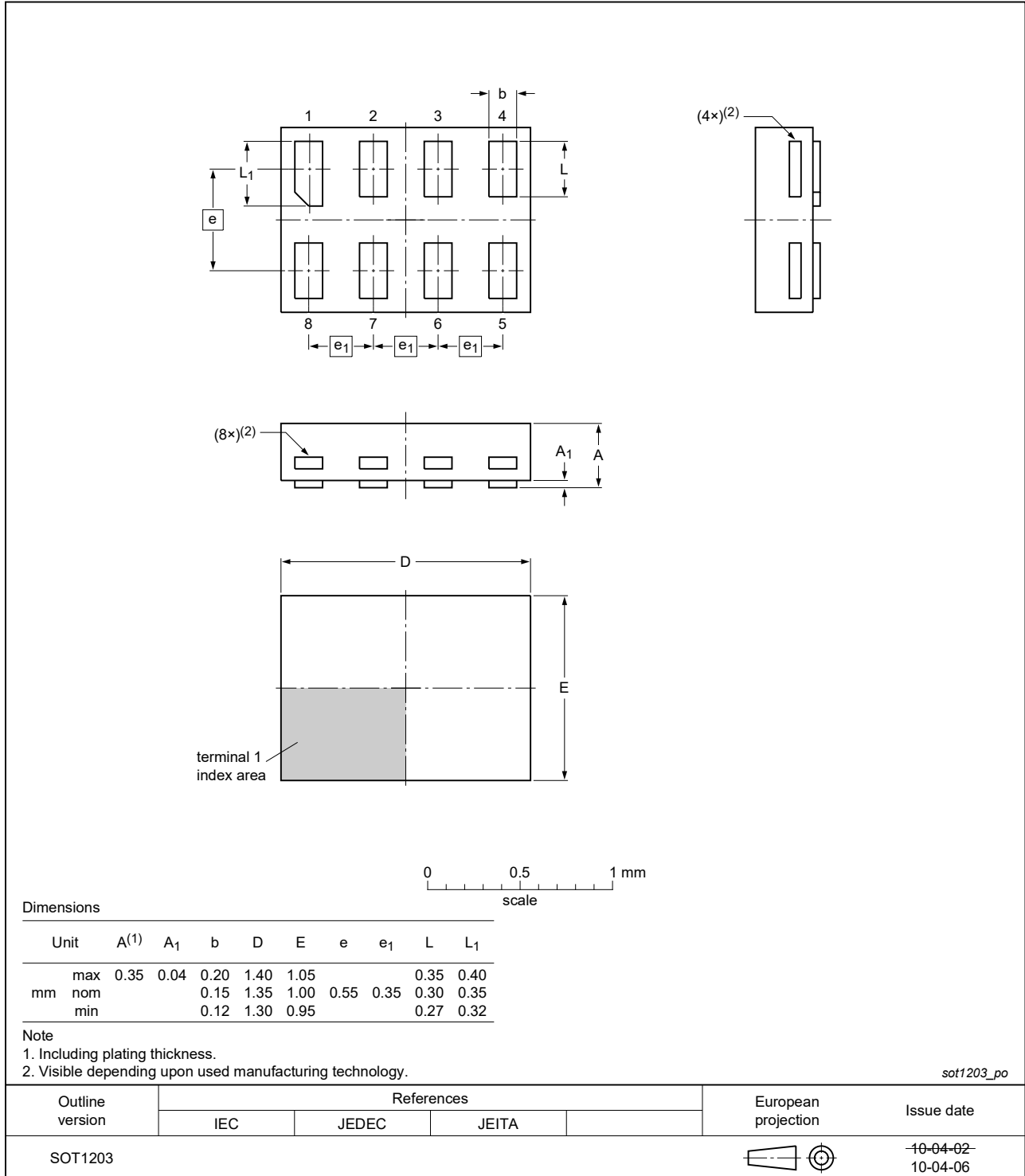


Fig. 18. Package outline SOT1203 (XSON8)

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

SOT1233-2

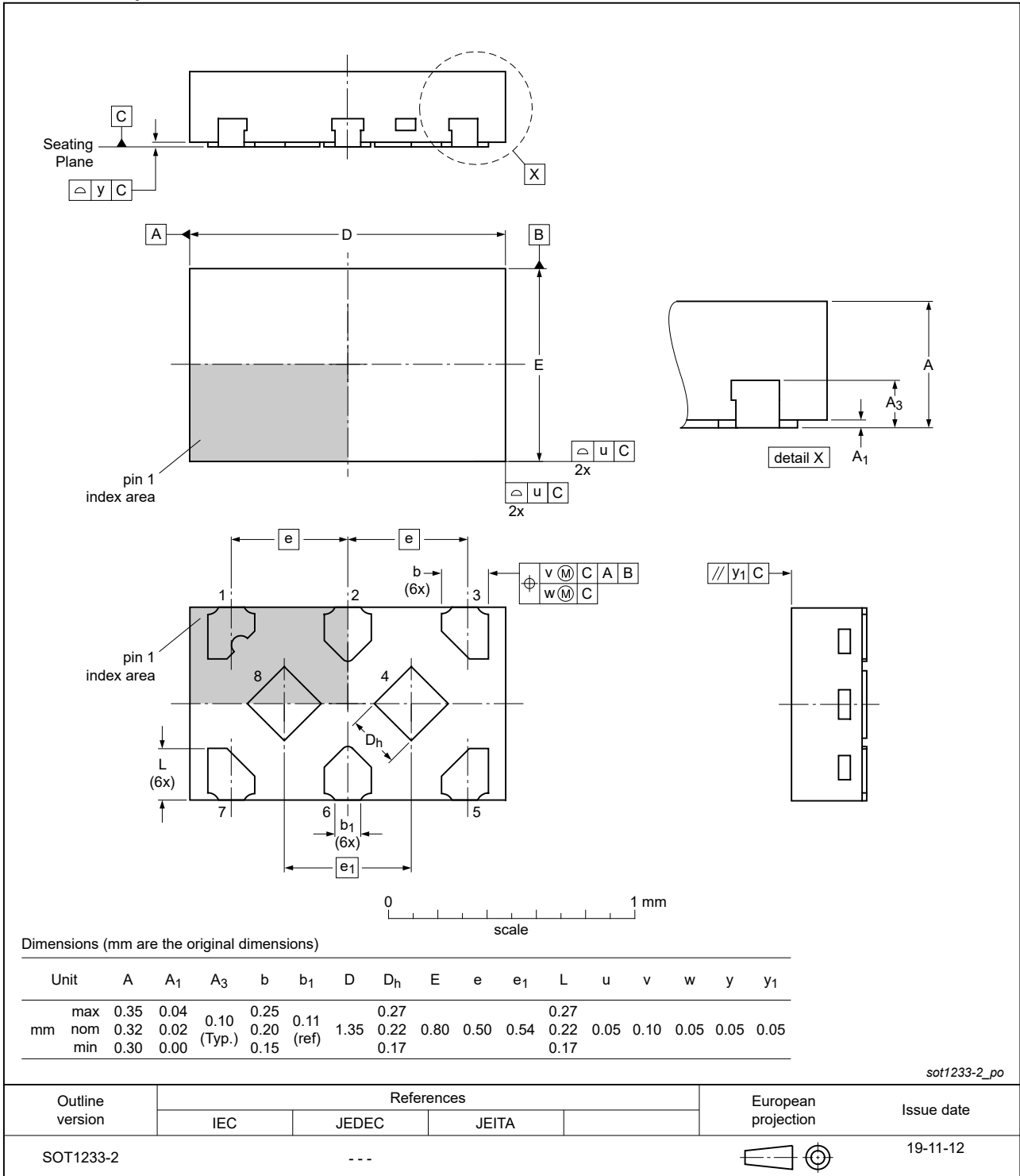


Fig. 19. Package outline SOT1233-2 (X2SON8)

16. Abbreviations

Table 12. Abbreviations

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

17. Revision history

Table 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|--|--------------------|---------------|----------------|
| 74AUP2G132 v.10 | 20230123 | Product data sheet | - | 74AUP2G132 v.9 |
| Modifications: | <ul style="list-style-type: none"> Type number 74AUP2G132GM (SOT902-2/XQFN8) removed. | | | |
| 74AUP2G132 v.9 | 20220622 | Product data sheet | - | 74AUP2G132 v.8 |
| Modifications: | <ul style="list-style-type: none"> SOT1233 (X2SON8) package changed to SOT1233-2 (X2SON8) package. Section 1 and Section 2 updated. Section 9: P_{tot} total power dissipation for SOT1233-2 (X2SON8) has been updated. | | | |
| 74AUP2G132 v.8 | 20170703 | Product data sheet | - | 74AUP2G132 v.7 |
| Modifications: | <ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. Type number 74AUP2G132GX (SOT1233 / X2SON8) added. Type number 74AUP2G132GD removed. | | | |
| 74AUP2G132 v.7 | 20130208 | Product data sheet | - | 74AUP2G132 v.6 |
| Modifications: | <ul style="list-style-type: none"> For type number 74AUP2G132GD XSON8U has changed to XSON8. | | | |
| 74AUP2G132 v.6 | 20120803 | Product data sheet | - | 74AUP2G132 v.5 |
| 74AUP2G132 v.5 | 20111201 | Product data sheet | - | 74AUP2G132 v.4 |
| 74AUP2G132 v.4 | 20101104 | Product data sheet | - | 74AUP2G132 v.3 |
| 74AUP2G132 v.3 | 20081215 | Product data sheet | - | 74AUP2G132 v.2 |
| 74AUP2G132 v.2 | 20080314 | Product data sheet | - | 74AUP2G132 v.1 |
| 74AUP2G132 v.1 | 20061018 | Product data sheet | - | - |

18. Legal information

Data sheet status

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

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [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 <https://www.nexperia.com>.

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