

74AUP1G17

Low-power Schmitt trigger

Rev. 13 — 13 January 2022

Product data sheet

1. General description

The 74AUP1G17 is a single buffer with Schmitt-trigger input. 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
- 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
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Low static power consumption; $I_{CC} = 0.9 \mu\text{A}$ (maximum)
- 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)
 - JESD8C (2.7 V to 3.6 V)
- ESD protection:
 - HBM: ANSI/ESDA/JEDEC JS-001 Class 3A exceeds 5000 V
 - CDM: ANSI/ESDA/JEDEC JS-002 Class C3 exceeds 1000 V
 - MM: JESD22-A115-A exceeds 200 V
- Multiple package options
- Specified from -40°C to $+85^\circ\text{C}$ and -40°C to $+125^\circ\text{C}$

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | |
|--------------|-------------------|--------|----------------------------------------------------------------------------------------------------------------|-----------|
| | Temperature range | Name | Description | Version |
| 74AUP1G17GW | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm | SOT353-1 |
| 74AUP1G17GV | -40 °C to +125 °C | SC-74A | plastic surface-mounted package; 5 leads | SOT753 |
| 74AUP1G17GM | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm | SOT886 |
| 74AUP1G17GN | -40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm | SOT1115 |
| 74AUP1G17GS | -40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm | SOT1202 |
| 74AUP1G17GX | -40 °C to +125 °C | X2SON5 | plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 × 0.8 × 0.32 mm | SOT1226-3 |
| 74AUP1G17GX4 | -40 °C to +125 °C | X2SON4 | plastic thermal enhanced extremely thin small outline package; no leads; 4 terminals; body 0.6 × 0.6 × 0.32 mm | SOT1269-2 |

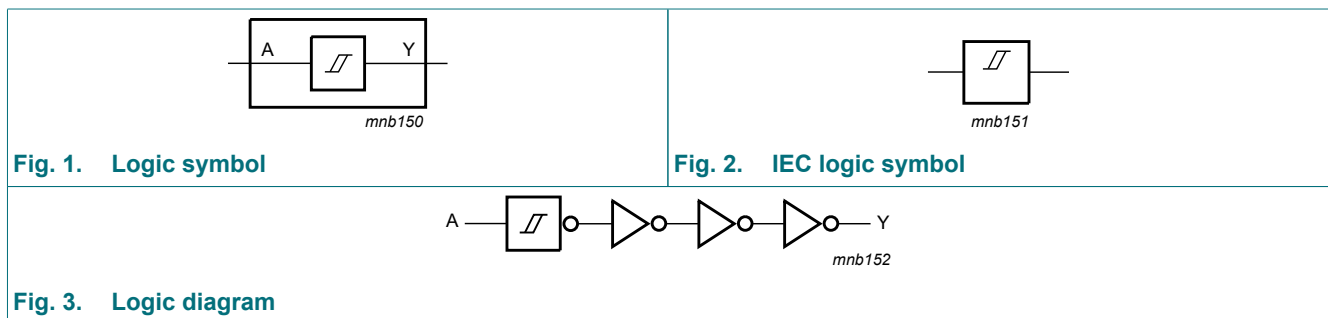
4. Marking

Table 2. Marking

| Type number | Marking code ^[1] |
|--------------|-----------------------------|
| 74AUP1G17GW | pJ |
| 74AUP1G17GV | pJ |
| 74AUP1G17GM | pJ |
| 74AUP1G17GN | pJ |
| 74AUP1G17GS | pJ |
| 74AUP1G17GX | pJ |
| 74AUP1G17GX4 | pJ |

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

5. Functional diagram



6. Pinning information

6.1. Pinning

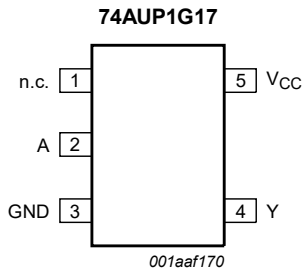


Fig. 4. Pin configuration SOT353-1 (TSSOP5) and SOT753 (SC-74A)

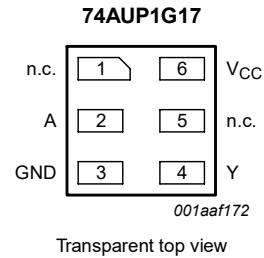


Fig. 5. Pin configuration SOT886, SOT1115 and SOT1202 (XSON6)

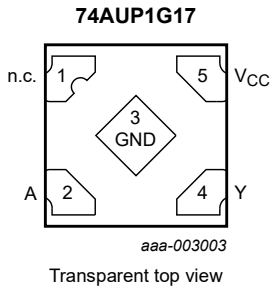


Fig. 6. Pin configuration SOT1226-3 (X2SON5)

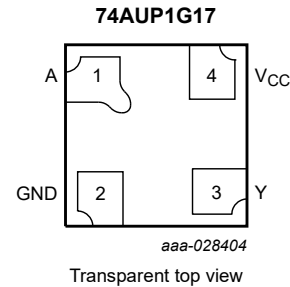


Fig. 7. Pin configuration SOT1269-2 (X2SON4)

6.2. Pin description

Table 3. Pin description

| Symbol | Pin | | | Description |
|-----------------|---------------------------|-------|--------|----------------|
| | SC-74A, TSSOP5 and X2SON5 | XSON6 | X2SON4 | |
| n.c. | 1 | 1, 5 | - | not connected |
| A | 2 | 2 | 1 | data input |
| GND | 3 | 3 | 2 | ground (0 V) |
| Y | 4 | 4 | 3 | data output |
| V _{CC} | 5 | 6 | 4 | supply voltage |

7. Functional description

Table 4. Function table

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

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

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|-------------------------|----------------------------------------------|------|----------|------|
| V_{CC} | supply voltage | | -0.5 | +4.6 | V |
| I_{IK} | input clamping current | $V_I < 0$ V | -50 | - | mA |
| V_I | input voltage | [1] | -0.5 | +4.6 | V |
| I_{OK} | output clamping current | $V_O < 0$ V | -50 | - | mA |
| V_O | output voltage | Active mode and Power-down mode [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 | | | |
| | | TSSOP5, SC-74A, XSON6 and X2SON5 package [2] | - | 250 | mW |
| | | X2SON4 package [3] | - | 150 | mW |

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

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

For SOT753 (SC-74A) package: P_{tot} derates linearly with 3.8 mW/K above 85 °C.

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

For SOT1115 (XSON6) package: P_{tot} derates linearly with 3.2 mW/K above 71 °C.

For SOT1202 (XSON6) package: P_{tot} derates linearly with 3.3 mW/K above 74 °C.

For SOT1226-3 (X2SON5) package: P_{tot} derates linearly with 3.0 mW/K above 67 °C.

[3] For SOT1269-2 (X2SON4) package: P_{tot} derates linearly with 1.7 mW/K above 57 °C.

9. Recommended operating conditions

Table 6. Recommended operating conditions

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|---------------------|---------------------------------|-----|----------|------|
| V_{CC} | supply voltage | | 0.8 | 3.6 | V |
| V_I | input voltage | | 0 | 3.6 | V |
| V_O | output voltage | Active mode | 0 | V_{CC} | V |
| | | Power-down mode; $V_{CC} = 0$ V | 0 | 3.6 | V |
| T_{amb} | ambient temperature | | -40 | +125 | °C |

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 _{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 | 0.75 × 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 |
| | | I _O = -4.0 mA; V _{CC} = 3.0 V | 2.6 | - | - | 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 | - | - | 0.31 | 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 _O = 4.0 mA; V _{CC} = 3.0 V | - | - | 0.44 | 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 _{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 |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | - | - | 40 | μA |
| 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 | - | - | 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 | - | - | 75 | μA |

11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 9

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|----------------------------------|-------------------|------------------------------------|-------|--------|------|------------------|------|-------------------|------|------|
| | | | Min | Typ[1] | Max | Min | Max | Min | Max | |
| C_L = 5 pF | | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Fig. 8 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 19.0 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.6 | 5.7 | 10.6 | 2.5 | 10.9 | 2.5 | 11.1 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.4 | 4.2 | 6.5 | 2.3 | 7.1 | 2.3 | 7.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 3.6 | 5.5 | 1.9 | 6.1 | 1.9 | 6.3 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.9 | 3.0 | 4.2 | 1.8 | 4.6 | 1.8 | 4.8 | ns |
| V _{CC} = 3.0 V to 3.6 V | 1.8 | 2.7 | 3.6 | 1.5 | 3.8 | 1.5 | 4.0 | ns | | |
| C_L = 10 pF | | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Fig. 8 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 22.5 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.9 | 6.6 | 12.4 | 2.7 | 12.9 | 2.7 | 13.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.6 | 4.8 | 7.8 | 2.4 | 8.3 | 2.4 | 8.7 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.5 | 4.2 | 6.3 | 2.4 | 6.8 | 2.4 | 7.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.3 | 3.5 | 4.8 | 2.1 | 5.3 | 2.1 | 5.6 | ns |
| V _{CC} = 3.0 V to 3.6 V | 2.1 | 3.3 | 4.4 | 2.0 | 4.6 | 2.0 | 4.8 | ns | | |
| C_L = 15 pF | | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Fig. 8 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 26.0 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.2 | 7.4 | 14.1 | 3.1 | 14.7 | 3.1 | 14.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.1 | 5.4 | 8.7 | 2.8 | 9.5 | 2.8 | 9.9 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.7 | 4.7 | 7.1 | 2.7 | 7.8 | 2.7 | 8.2 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.6 | 4.0 | 5.6 | 2.5 | 6.0 | 2.5 | 6.3 | ns |
| V _{CC} = 3.0 V to 3.6 V | 2.5 | 3.7 | 4.9 | 2.2 | 5.2 | 2.2 | 5.5 | ns | | |
| C_L = 30 pF | | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Fig. 8 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 36.3 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.9 | 9.7 | 19.0 | 3.7 | 19.8 | 3.7 | 20.1 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.5 | 7.0 | 11.2 | 3.6 | 12.4 | 3.6 | 13.0 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 3.5 | 6.0 | 9.2 | 3.4 | 10.1 | 3.4 | 10.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 3.4 | 5.1 | 7.0 | 3.2 | 7.5 | 3.2 | 7.9 | ns |
| V _{CC} = 3.0 V to 3.6 V | 3.3 | 4.8 | 6.2 | 3.1 | 7.1 | 3.1 | 7.5 | ns | | |

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------------------------------------------|-------------------------------|--------------------------------------------------------|-------|--------|-----|------------------|-----|-------------------|-----|------|
| | | | Min | Typ[1] | Max | Min | Max | Min | Max | |
| C_L = 5 pF, 10 pF, 15 pF and 30 pF | | | | | | | | | | |
| C _{PD} | power dissipation capacitance | f = 1 MHz; V _I = GND to V _{CC} [3] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 2.5 | - | - | - | - | - | pF |
| | | V _{CC} = 1.1 V to 1.3 V | - | 2.7 | - | - | - | - | - | pF |
| | | V _{CC} = 1.4 V to 1.6 V | - | 2.8 | - | - | - | - | - | pF |
| | | V _{CC} = 1.65 V to 1.95 V | - | 3.0 | - | - | - | - | - | pF |
| | | V _{CC} = 2.3 V to 2.7 V | - | 3.5 | - | - | - | - | - | pF |
| | | V _{CC} = 3.0 V to 3.6 V | - | 4.0 | - | - | - | - | - | 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).
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ 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;
 $\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

11.1. Waveform and test circuit

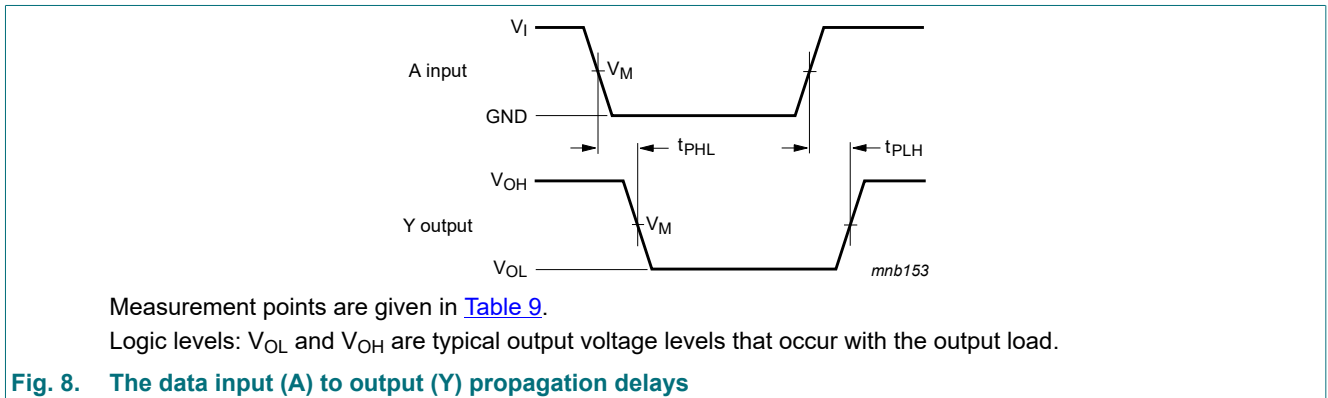
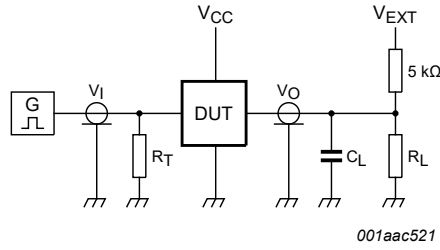


Fig. 8. The data input (A) to output (Y) propagation delays

Table 9. Measurement points

| Supply voltage | Output | Input | | |
|-----------------|-----------------------|-----------------------|-----------------|---------------------------------|
| V _{CC} | V _M | V _M | V _I | t _r = t _f |
| 0.8 V to 3.6 V | 0.5 x V _{CC} | 0.5 x V _{CC} | V _{CC} | ≤ 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. 9. Test circuit for measuring switching times

Table 10. Test data

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

[1] For measuring enable and disable times, $R_L = 5 \text{ k}\Omega$.

For measuring propagation delays, setup and hold times and pulse width $R_L = 1 \text{ M}\Omega$.

12. Transfer characteristics

Table 11. Transfer characteristics

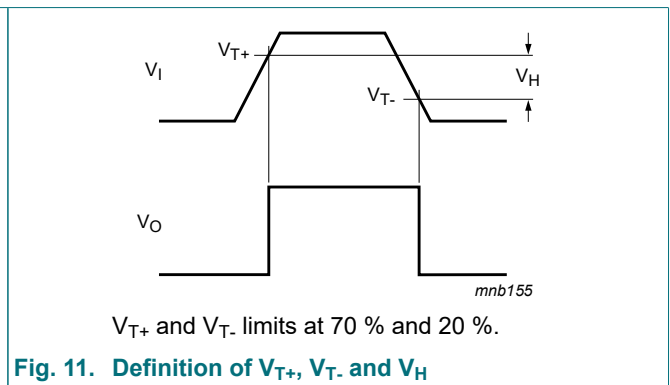
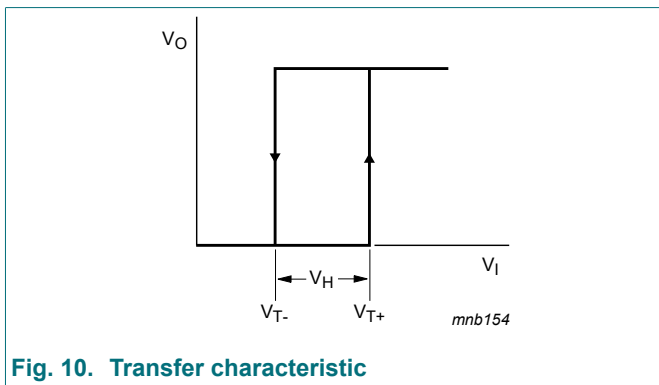
Voltages are referenced to GND (ground = 0 V).

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------|------|-----|------|------|
| T_{amb} = 25 °C | | | | | | |
| V _{T+} | positive-going threshold voltage | see Fig. 10 and Fig. 11 | | | | |
| | | V _{CC} = 0.8 V | 0.30 | - | 0.60 | V |
| | | V _{CC} = 1.1 V | 0.53 | - | 0.90 | V |
| | | V _{CC} = 1.4 V | 0.74 | - | 1.11 | V |
| | | V _{CC} = 1.65 V | 0.91 | - | 1.29 | V |
| | | V _{CC} = 2.3 V | 1.37 | - | 1.77 | V |
| | | V _{CC} = 3.0 V | 1.88 | - | 2.29 | V |
| V _{T-} | negative-going threshold voltage | see Fig. 10 and Fig. 11 | | | | |
| | | V _{CC} = 0.8 V | 0.10 | - | 0.60 | V |
| | | V _{CC} = 1.1 V | 0.26 | - | 0.65 | V |
| | | V _{CC} = 1.4 V | 0.39 | - | 0.75 | V |
| | | V _{CC} = 1.65 V | 0.47 | - | 0.84 | V |
| | | V _{CC} = 2.3 V | 0.69 | - | 1.04 | V |
| | | V _{CC} = 3.0 V | 0.88 | - | 1.24 | V |
| V _H | hysteresis voltage | see Fig. 10 , Fig. 11 , Fig. 12 and Fig. 13 | | | | |
| | | V _{CC} = 0.8 V | 0.07 | - | 0.50 | V |
| | | V _{CC} = 1.1 V | 0.08 | - | 0.46 | V |
| | | V _{CC} = 1.4 V | 0.18 | - | 0.56 | V |
| | | V _{CC} = 1.65 V | 0.27 | - | 0.66 | V |
| | | V _{CC} = 2.3 V | 0.53 | - | 0.92 | V |
| | | V _{CC} = 3.0 V | 0.79 | - | 1.31 | V |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------|------|-----|------|------|
| T_{amb} = -40 °C to +85 °C | | | | | | |
| V _{T+} | positive-going threshold voltage | see Fig. 10 and Fig. 11 | | | | |
| | | V _{CC} = 0.8 V | 0.30 | - | 0.60 | V |
| | | V _{CC} = 1.1 V | 0.53 | - | 0.90 | V |
| | | V _{CC} = 1.4 V | 0.74 | - | 1.11 | V |
| | | V _{CC} = 1.65 V | 0.91 | - | 1.29 | V |
| | | V _{CC} = 2.3 V | 1.37 | - | 1.77 | V |
| V _{T-} | negative-going threshold voltage | see Fig. 10 and Fig. 11 | | | | |
| | | V _{CC} = 0.8 V | 0.10 | - | 0.60 | V |
| | | V _{CC} = 1.1 V | 0.26 | - | 0.65 | V |
| | | V _{CC} = 1.4 V | 0.39 | - | 0.75 | V |
| | | V _{CC} = 1.65 V | 0.47 | - | 0.84 | V |
| | | V _{CC} = 2.3 V | 0.69 | - | 1.04 | V |
| V _H | hysteresis voltage | see Fig. 10 , Fig. 11 , Fig. 12 and Fig. 13 | | | | |
| | | V _{CC} = 0.8 V | 0.07 | - | 0.50 | V |
| | | V _{CC} = 1.1 V | 0.08 | - | 0.46 | V |
| | | V _{CC} = 1.4 V | 0.18 | - | 0.56 | V |
| | | V _{CC} = 1.65 V | 0.27 | - | 0.66 | V |
| | | V _{CC} = 2.3 V | 0.53 | - | 0.92 | V |
| | | V _{CC} = 3.0 V | 0.79 | - | 1.31 | V |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------|------|-----|------|------|
| T_{amb} = -40 °C to +125 °C | | | | | | |
| V _{T+} | positive-going threshold voltage | see Fig. 10 and Fig. 11 | | | | |
| | | V _{CC} = 0.8 V | 0.30 | - | 0.62 | V |
| | | V _{CC} = 1.1 V | 0.53 | - | 0.92 | V |
| | | V _{CC} = 1.4 V | 0.74 | - | 1.13 | V |
| | | V _{CC} = 1.65 V | 0.91 | - | 1.31 | V |
| | | V _{CC} = 2.3 V | 1.37 | - | 1.80 | V |
| V _{T-} | negative-going threshold voltage | see Fig. 10 and Fig. 11 | | | | |
| | | V _{CC} = 0.8 V | 0.10 | - | 0.60 | V |
| | | V _{CC} = 1.1 V | 0.26 | - | 0.65 | V |
| | | V _{CC} = 1.4 V | 0.39 | - | 0.75 | V |
| | | V _{CC} = 1.65 V | 0.47 | - | 0.84 | V |
| | | V _{CC} = 2.3 V | 0.69 | - | 1.04 | V |
| V _H | hysteresis voltage | see Fig. 10 , Fig. 11 , Fig. 12 and Fig. 13 | | | | |
| | | V _{CC} = 0.8 V | 0.07 | - | 0.50 | V |
| | | V _{CC} = 1.1 V | 0.08 | - | 0.46 | V |
| | | V _{CC} = 1.4 V | 0.18 | - | 0.56 | V |
| | | V _{CC} = 1.65 V | 0.27 | - | 0.66 | V |
| | | V _{CC} = 2.3 V | 0.53 | - | 0.92 | V |
| | | V _{CC} = 3.0 V | 0.79 | - | 1.31 | V |

12.1. Waveforms transfer characteristics



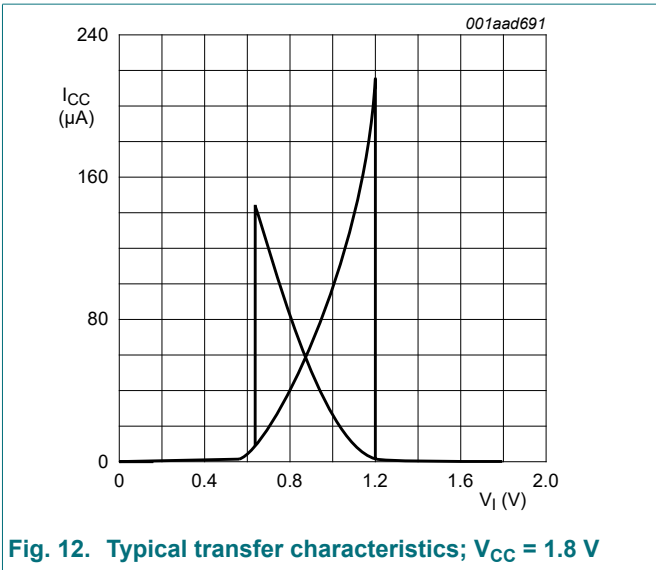


Fig. 12. Typical transfer characteristics; $V_{CC} = 1.8\text{ V}$

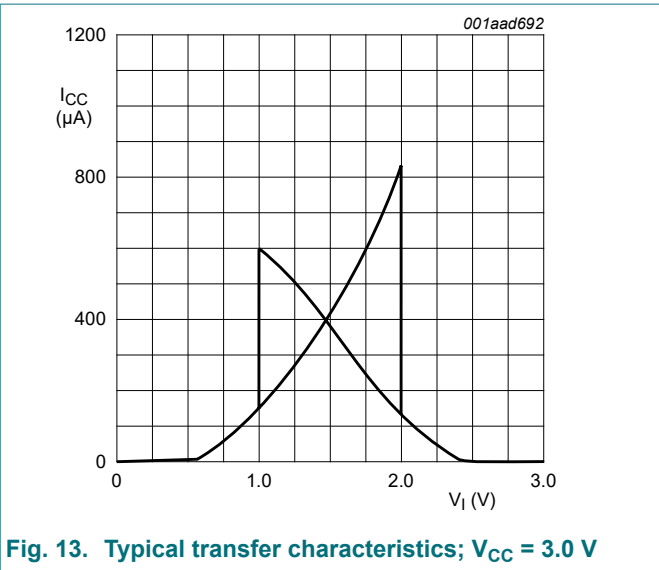


Fig. 13. Typical transfer characteristics; $V_{CC} = 3.0\text{ V}$

13. Application information

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

$$P_{ad} = f_i \times (t_r \times I_{CC(AV)} + t_f \times I_{CC(AV)}) \times V_{CC} \text{ where:}$$

- P_{ad} = 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 %;
- $I_{CC(AV)}$ = average additional supply current (μA).

Average I_{CC} differs with positive or negative input transitions, as shown in Fig. 14.

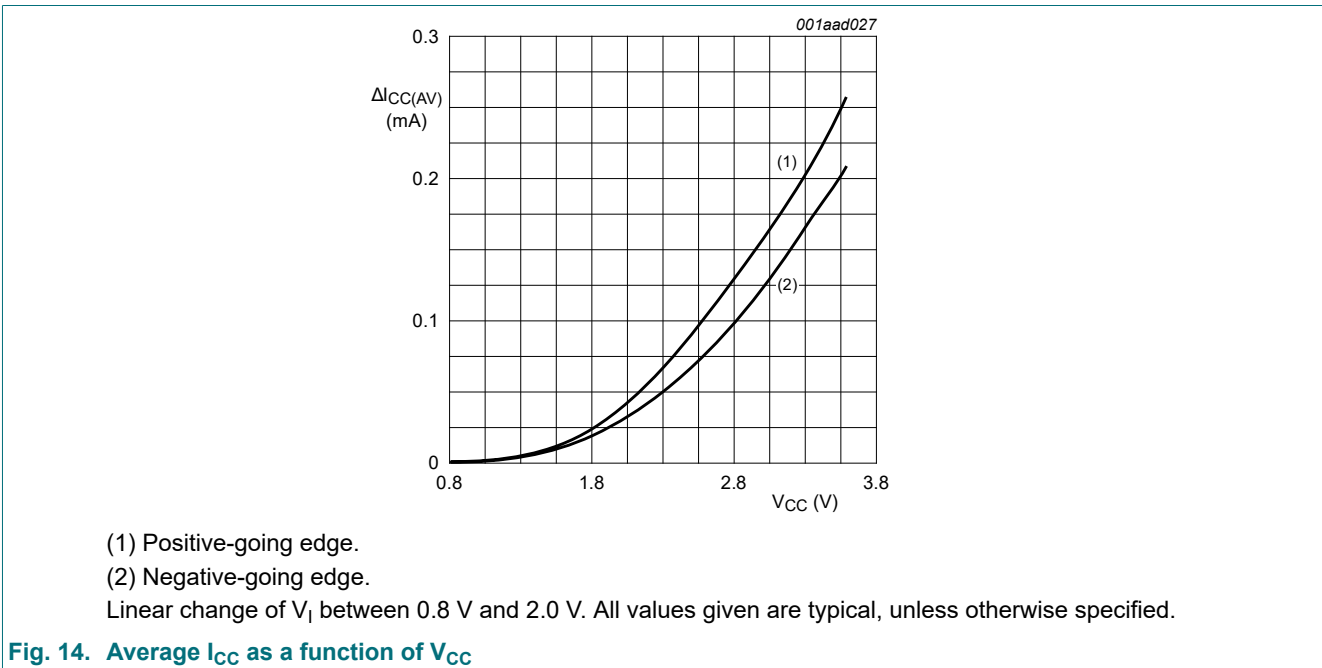


Fig. 14. Average I_{CC} as a function of V_{CC}

14. Package outline

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

SOT353-1

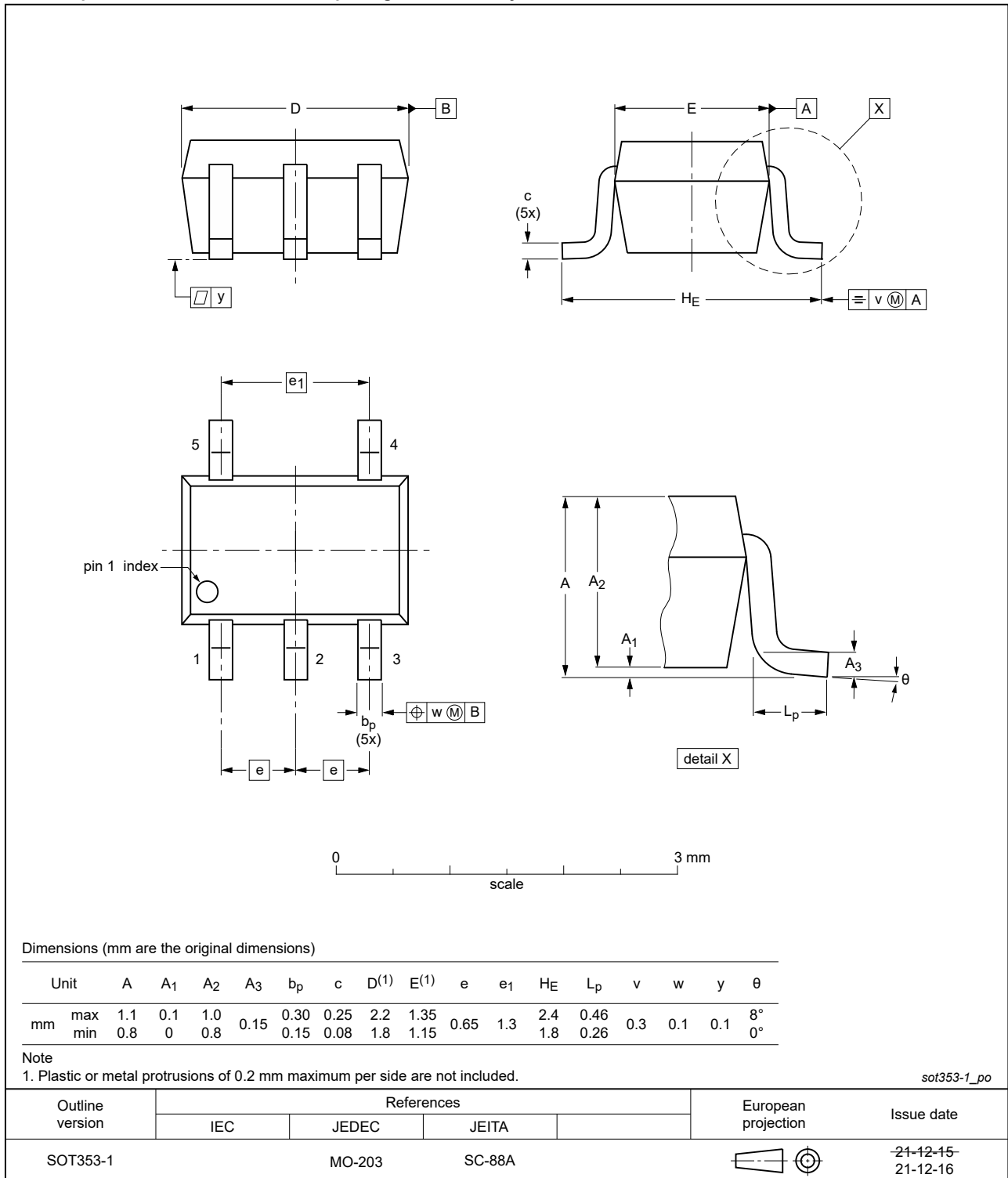


Fig. 15. Package outline SOT353-1 (TSSOP5)

Plastic surface-mounted package; 5 leads

SOT753

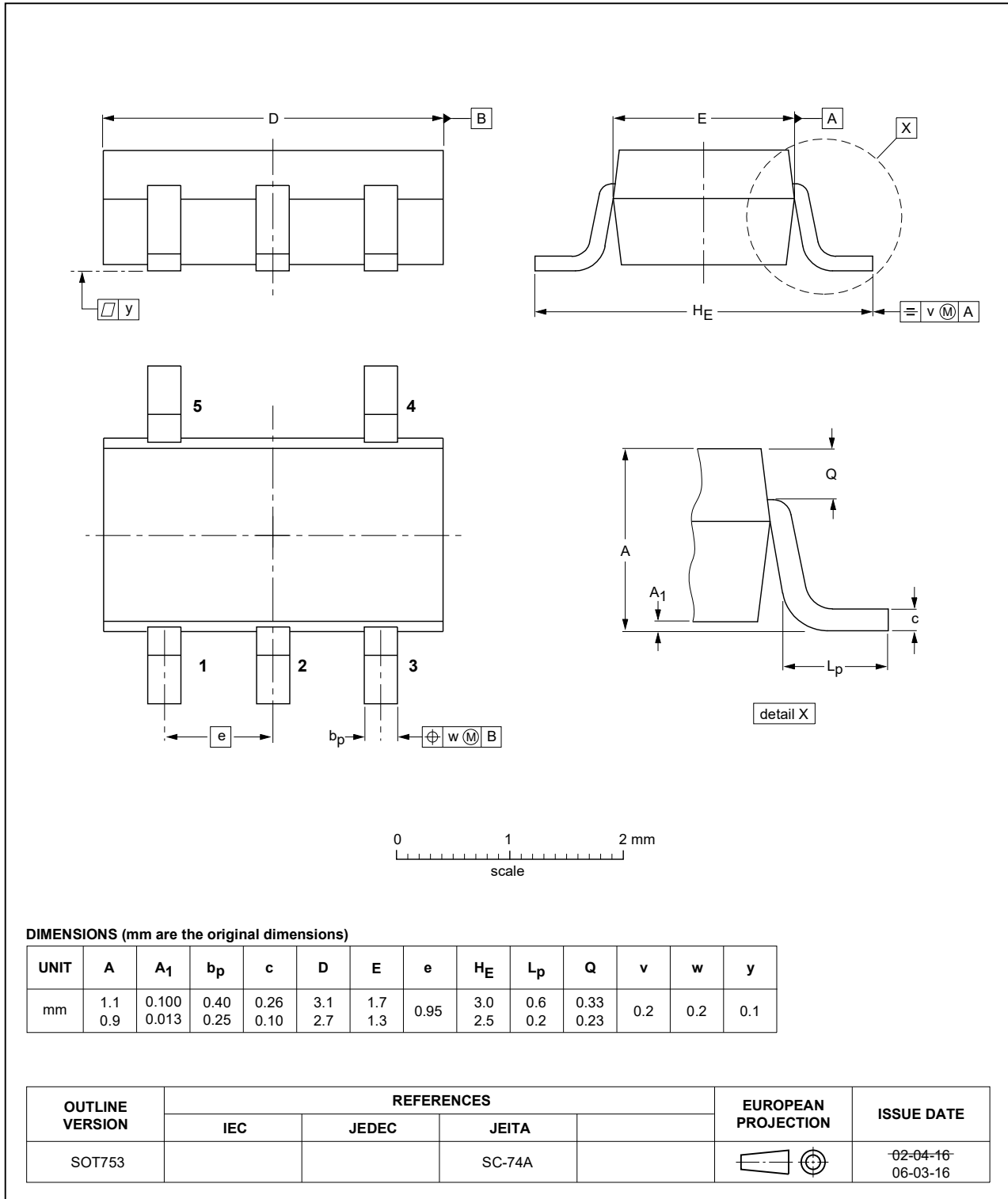


Fig. 16. Package outline SOT753 (SC-74A)

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

SOT886

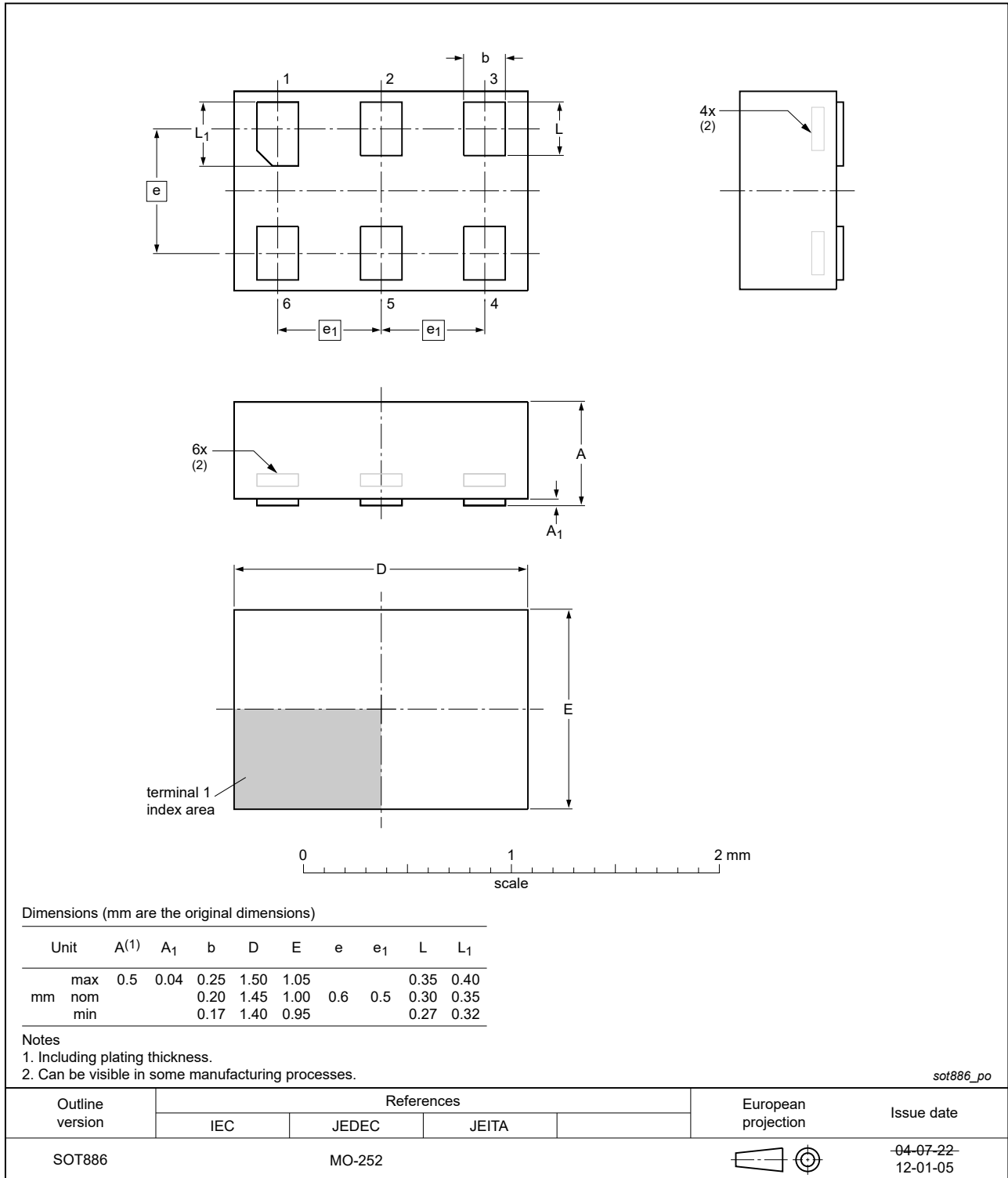


Fig. 17. Package outline SOT886 (XSON6)

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

SOT1115

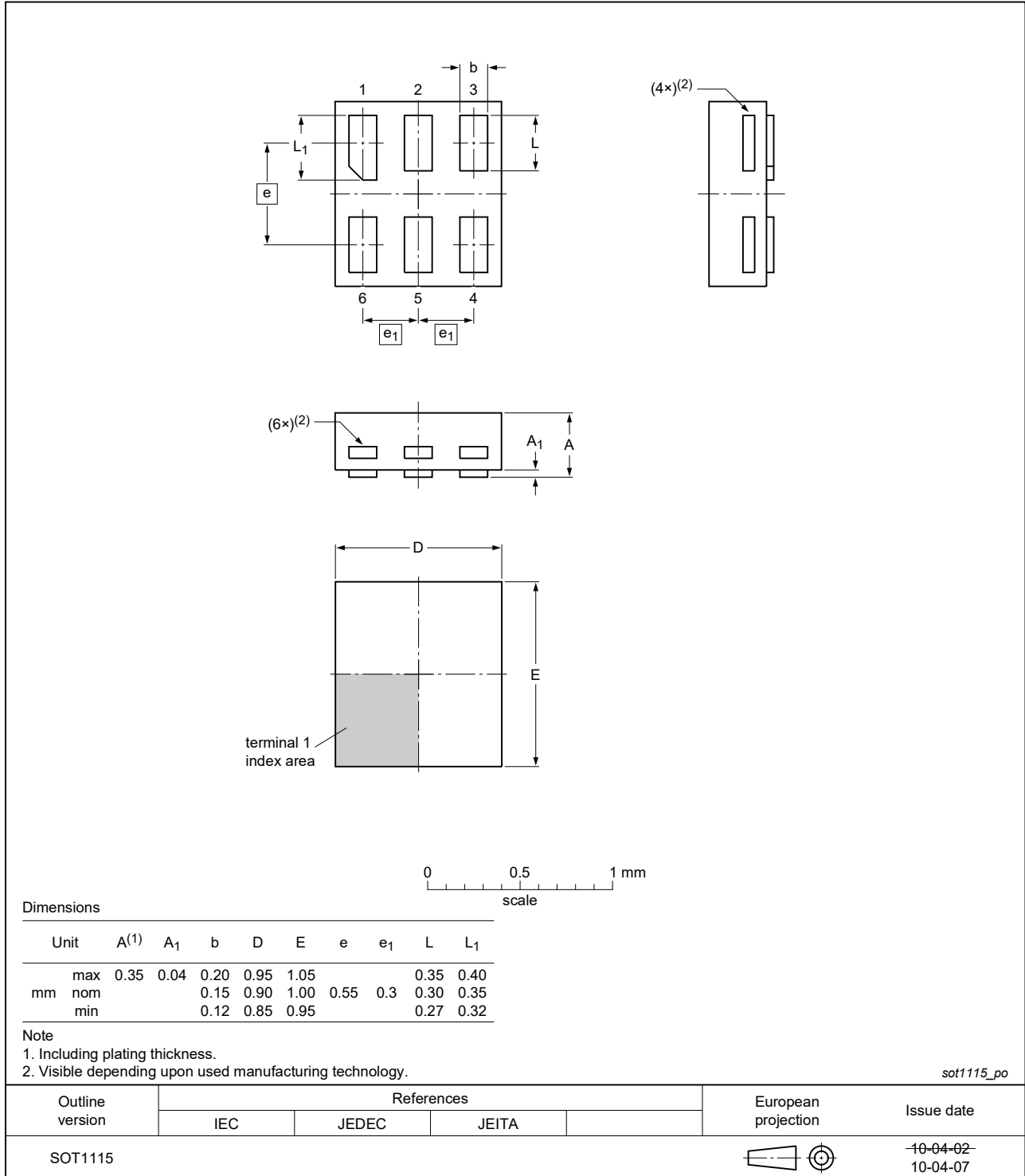


Fig. 18. Package outline SOT1115 (XSON6)

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

SOT1202

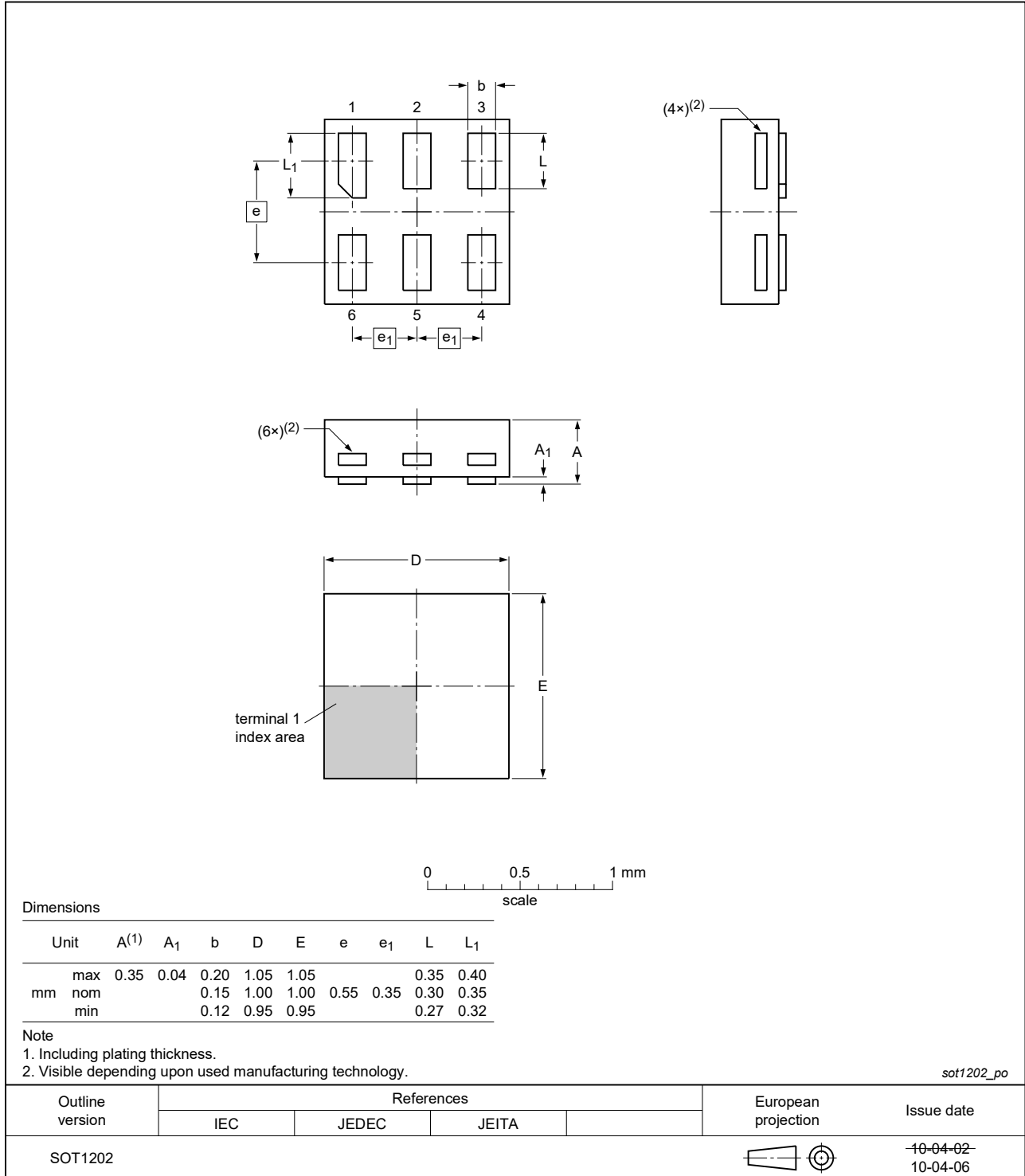


Fig. 19. Package outline SOT1202 (XSON6)

X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.32 mm

SOT1226-3

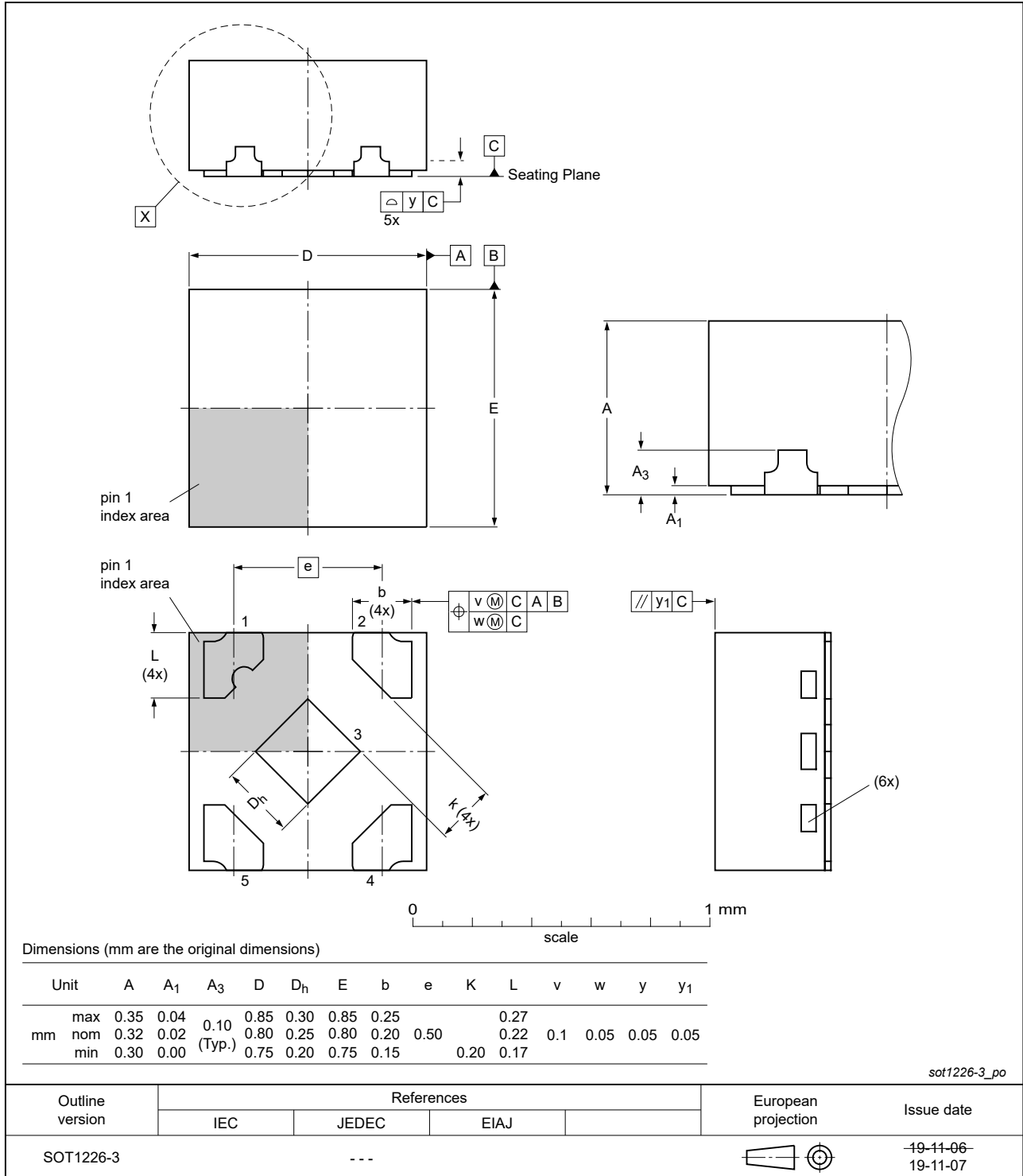


Fig. 20. Package outline SOT1226-3 (X2SON5)

X2SON4: plastic thermal enhanced extremely thin small outline package; no leads; 4 terminals; body 0.6 x 0.6 x 0.32 mm

SOT1269-2

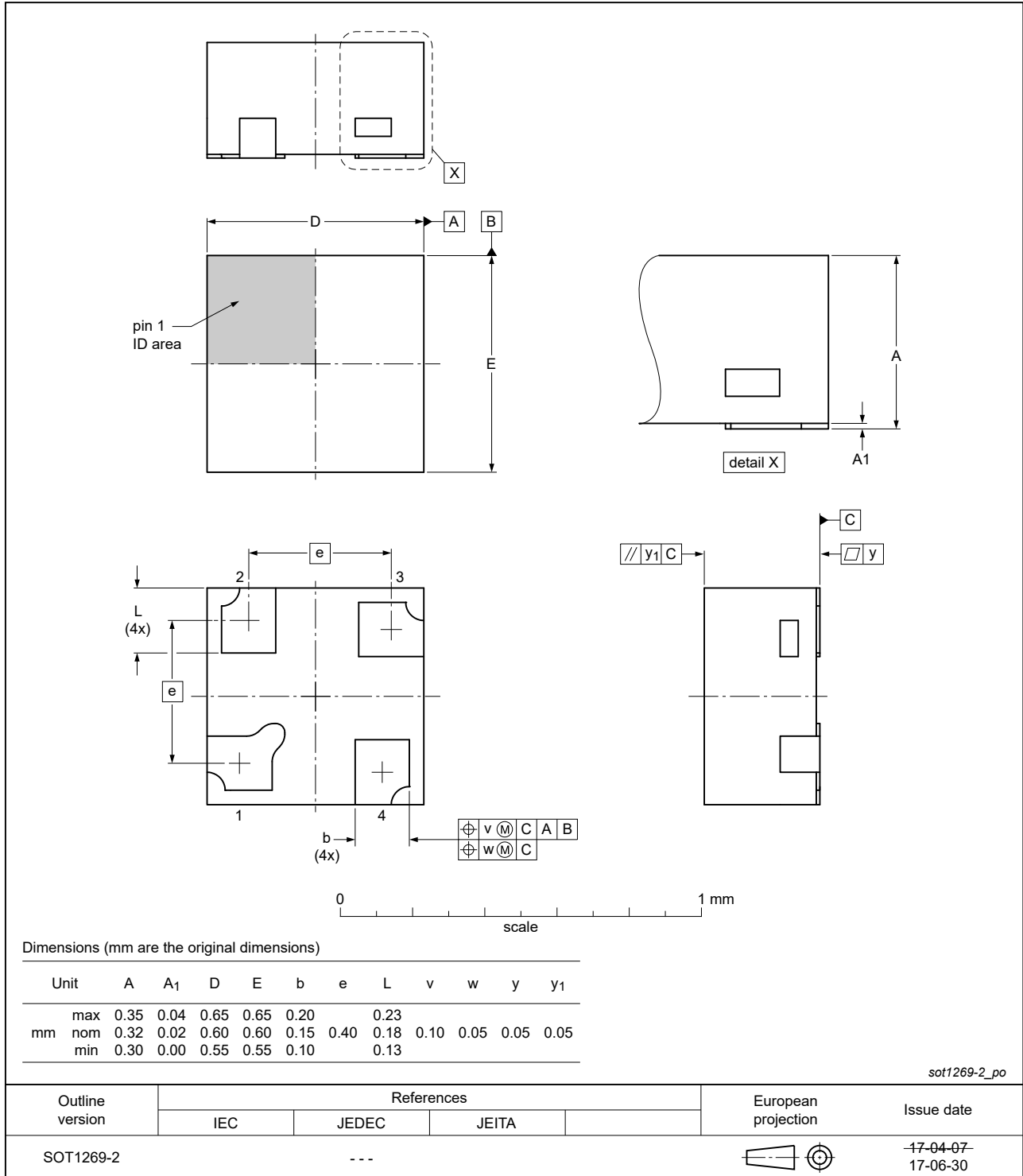


Fig. 21. Package outline SOT1269-2 (X2SON4)

15. Abbreviations

Table 12. 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 |

16. Revision history

Table 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|----------------|
| 74AUP1G17 v.13 | 20220113 | Product data sheet | - | 74AUP1G17 v.12 |
| Modifications: | <ul style="list-style-type: none"> Fig. 15: Package outline drawing for SOT353-1 (TSSOP5) has changed. | | | |
| 74AUP1G17 v.12 | 20210707 | Product data sheet | - | 74AUP1G17 v.11 |
| Modifications: | <ul style="list-style-type: none"> SOT1226 (X2SON5) package changed to SOT1226-3 (X2SON5) package. Type number 74AUP1G17GF (SOT891/XSON6) removed. Table 5: Derating values for P_{tot} total power dissipation have been updated. | | | |
| 74AUP1G17 v.11 | 20180608 | Product data sheet | - | 74AUP1G17 v.10 |
| Modifications: | <ul style="list-style-type: none"> Added type number 74AUP1G17GX4 (SOT1269-2) | | | |
| 74AUP1G17 v.10 | 20170519 | Product data sheet | - | 74AUP1G17 v.9 |
| 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. | | | |
| 74AUP1G17 v.9 | 20161104 | Product data sheet | - | 74AUP1G17 v.8 |
| Modifications: | <ul style="list-style-type: none"> Added type number 74AUP1G17GV (SOT753) | | | |
| 74AUP1G17 v.8 | 20150115 | Product data sheet | - | 74AUP1G17 v.7 |
| Modifications: | <ul style="list-style-type: none"> Marking code Table 2: typo corrected in type number 74AUP1G17GX. | | | |
| 74AUP1G17 v.7 | 20120716 | Product data sheet | - | 74AUP1G17 v.6 |
| Modifications: | <ul style="list-style-type: none"> Package outline drawing of SOT1226 (Fig. 20) modified. | | | |
| 74AUP1G17 v.6 | 20120412 | Product data sheet | - | 74AUP1G17 v.5 |
| Modifications: | <ul style="list-style-type: none"> Added type number 74AUP1G17GX (SOT1226) Package outline drawing of SOT886 (Fig. 17) modified. | | | |
| 74AUP1G17 v.5 | 20111124 | Product data sheet | - | 74AUP1G17 v.4 |
| Modifications: | <ul style="list-style-type: none"> Legal pages updated. | | | |
| 74AUP1G17 v.4 | 20100715 | Product data sheet | - | 74AUP1G17 v.3 |
| 74AUP1G17 v.3 | 20090710 | Product data sheet | - | 74AUP1G17 v.2 |
| 74AUP1G17 v.2 | 20060727 | Product data sheet | - | 74AUP1G17 v.1 |
| 74AUP1G17 v.1 | 20050726 | Product data sheet | - | - |

17. Legal information

Data sheet status

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

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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