

74AUP1G157

Low-power 2-input multiplexer

Rev. 7 — 28 January 2019

Product data sheet

1. General description

The 74AUP1G157 is a single 2-input multiplexer which selects data from two data inputs (I0 and I1) under control of a common data select input (S). The state of the common data select input determines the particular register from which the data comes. The output (Y) presents the selected data in the true (non-inverted) form.

Schmitt trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire V_{CC} range from 0.8 V to 3.6 V.

This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8 V to 3.6 V.

This device is fully specified for partial power-down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

2. Features and benefits

- 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; $I_{CC} = 0.9 \mu A$ (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot < 10 % of V_{CC}
- I_{OFF} circuitry provides partial Power-down mode operation
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

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3. Ordering information

Table 1. Ordering information

| Type number | Package | | | |
|--------------|-------------------|--------|---|---------|
| | Temperature range | Name | Description | Version |
| 74AUP1G157GW | -40 °C to +125 °C | SC-88 | plastic surface-mounted package; 6 leads | SOT363 |
| 74AUP1G157GM | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm | SOT886 |
| 74AUP1G157GF | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm | SOT891 |
| 74AUP1G157GN | -40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm | SOT1115 |
| 74AUP1G157GS | -40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm | SOT1202 |
| 74AUP1G157GX | -40 °C to +125 °C | X2SON6 | plastic thermal extremely thin small outline package; no leads; 6 terminals; body 1 × 0.8 × 0.35 mm | SOT1255 |

4. Marking

Table 2. Marking

| Type number | Marking code [1] |
|--------------|------------------|
| 74AUP1G157GW | aP |
| 74AUP1G157GM | aP |
| 74AUP1G157GF | aP |
| 74AUP1G157GN | aP |
| 74AUP1G157GS | aP |
| 74AUP1G157GX | aP |

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

5. Functional diagram

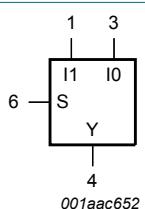


Fig. 1. Logic symbol

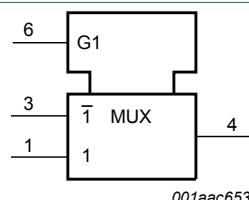


Fig. 2. IEC logic symbol

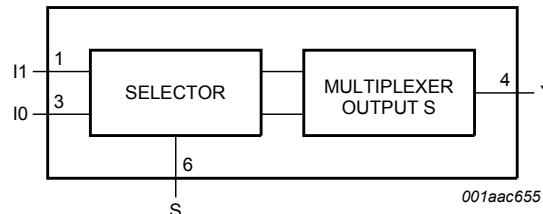


Fig. 3. Functional diagram

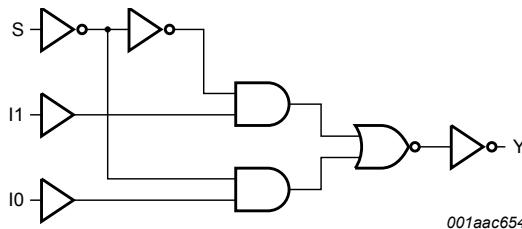


Fig. 4. Logic diagram

6. Pinning information

6.1. Pinning

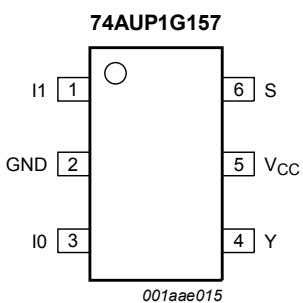


Fig. 5. Pin configuration SOT363 (SC-88)

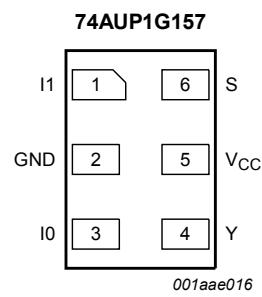


Fig. 6. Pin configuration SOT886 (XSON6)

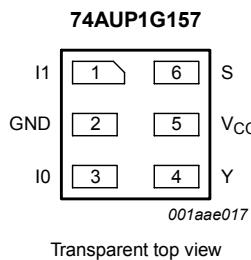


Fig. 7. Pin configuration SOT891, SOT1115 and SOT1202 (XSON6)

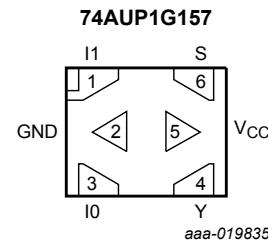


Fig. 8. Pin configuration SOT1255 (X2SON6)

6.2. Pin description

Table 3. Pin description

| Symbol | Pin | Description |
|-----------------|-----|--------------------------|
| I1 | 1 | data input from source 1 |
| GND | 2 | ground (0 V) |
| I0 | 3 | data input from source 0 |
| Y | 4 | multiplexer output |
| V _{CC} | 5 | supply voltage |
| S | 6 | common data select input |

7. Functional description

Table 4. Function table

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

| Input | | | Output |
|-------|----|----|--------|
| S | I1 | I0 | Y |
| L | X | L | L |
| L | X | H | H |
| H | L | X | L |
| H | H | X | 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 |
| 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 |
| 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 minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] For SC-88 packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.

For X2SON6 and XSON6 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 |
| Δt/ΔV | 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 |
| | | I _O = -4.0 mA; V _{CC} = 3.0 V | 2.6 | - | - | 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 _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; One input at V _{CC} - 0.6 V, other inputs at V _{CC} or GND. | - | - | 40 | µA |
| C _I | input capacitance | V _{CC} = 0 V to 3.6 V; V _I = GND or V _{CC} | - | 0.8 | - | 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 _{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 | 0.7 × 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 _{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 | - | - | 0.37 | 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; One input at V _{CC} - 0.6 V, other inputs at V _{CC} or GND. | - | - | 50 | µA |
| T_{amb} = -40 °C to +125 °C | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 0.8 V | 0.75 × V _{CC} | - | - | V |
| | | V _{CC} = 0.9 V to 1.95 V | 0.70 × 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 × V _{CC} | V |
| | | V _{CC} = 0.9 V to 1.95 V | - | - | 0.30 × 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 |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--------------------------------------|--|---------------------|-----|----------------------|---------|
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20 \mu A$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | $V_{CC} - 0.11$ | - | - | V |
| | | $I_O = -1.1 \text{ mA}$; $V_{CC} = 1.1 \text{ V}$ | $0.6 \times V_{CC}$ | - | - | V |
| | | $I_O = -1.7 \text{ mA}$; $V_{CC} = 1.4 \text{ V}$ | 0.93 | - | - | V |
| | | $I_O = -1.9 \text{ mA}$; $V_{CC} = 1.65 \text{ V}$ | 1.17 | - | - | V |
| | | $I_O = -2.3 \text{ mA}$; $V_{CC} = 2.3 \text{ V}$ | 1.77 | - | - | V |
| | | $I_O = -3.1 \text{ mA}$; $V_{CC} = 2.3 \text{ V}$ | 1.67 | - | - | V |
| | | $I_O = -2.7 \text{ mA}$; $V_{CC} = 3.0 \text{ V}$ | 2.40 | - | - | V |
| | | $I_O = -4.0 \text{ mA}$; $V_{CC} = 3.0 \text{ V}$ | 2.30 | - | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = 20 \mu A$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | - | - | 0.11 | V |
| | | $I_O = 1.1 \text{ mA}$; $V_{CC} = 1.1 \text{ V}$ | - | - | $0.33 \times V_{CC}$ | V |
| | | $I_O = 1.7 \text{ mA}$; $V_{CC} = 1.4 \text{ V}$ | - | - | 0.41 | V |
| | | $I_O = 1.9 \text{ mA}$; $V_{CC} = 1.65 \text{ V}$ | - | - | 0.39 | V |
| | | $I_O = 2.3 \text{ mA}$; $V_{CC} = 2.3 \text{ V}$ | - | - | 0.36 | V |
| | | $I_O = 3.1 \text{ mA}$; $V_{CC} = 2.3 \text{ V}$ | - | - | 0.50 | V |
| | | $I_O = 2.7 \text{ mA}$; $V_{CC} = 3.0 \text{ V}$ | - | - | 0.36 | V |
| | | $I_O = 4.0 \text{ mA}$; $V_{CC} = 3.0 \text{ V}$ | - | - | 0.50 | V |
| I_I | input leakage current | $V_I = \text{GND to } 3.6 \text{ V}$; $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$ | - | - | ± 0.75 | μA |
| I_{OFF} | power-off leakage current | V_I or $V_O = 0 \text{ V to } 3.6 \text{ V}$; $V_{CC} = 0 \text{ V}$ | - | - | ± 0.75 | μA |
| ΔI_{OFF} | additional power-off leakage current | V_I or $V_O = 0 \text{ V to } 3.6 \text{ V}$; $V_{CC} = 0 \text{ V to } 0.2 \text{ V}$ | - | - | ± 0.75 | μA |
| I_{CC} | supply current | $V_I = \text{GND or } V_{CC}$; $I_O = 0 \text{ A}$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | - | - | 1.4 | μA |
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 0.6 \text{ V}$; $I_O = 0 \text{ A}$; $V_{CC} = 3.3 \text{ V}$; One input at $V_{CC} - 0.6 \text{ V}$, other inputs at V_{CC} or GND. | - | - | 75 | μA |

11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 10.

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +125 °C | | | Unit |
|----------------------|-------------------|--|-------|---------|------|-------------------|-------------|--------------|------|
| | | | Min | Typ [1] | Max | Min | Max (85 °C) | Max (125 °C) | |
| $C_L = 5 \text{ pF}$ | | | | | | | | | |
| t_{pd} | propagation delay | I_O, I_1 or S to Y ; see Fig. 9 [2] | | | | | | | |
| | | $V_{CC} = 0.8 \text{ V}$ | - | 19.9 | - | - | - | - | ns |
| | | $V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$ | 2.3 | 5.7 | 11.2 | 2.1 | 11.4 | 12.6 | ns |
| | | $V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$ | 1.7 | 4.0 | 6.5 | 1.9 | 7.0 | 7.7 | ns |
| | | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$ | 1.6 | 3.2 | 5.2 | 1.5 | 5.8 | 6.4 | ns |
| | | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$ | 1.4 | 2.5 | 3.8 | 1.1 | 4.2 | 4.7 | ns |
| | | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ | 1.2 | 2.2 | 3.2 | 0.9 | 3.5 | 3.9 | ns |

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +125 °C | | | Unit |
|---|-------------------------------|--|-------|---------|------|-------------------|-------------|--------------|------|
| | | | Min | Typ [1] | Max | Min | Max (85 °C) | Max (125 °C) | |
| C_L = 10 pF | | | | | | | | | |
| t _{pd} | propagation delay | I0, I1 or S to Y; see Fig. 9 [2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 23.5 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.7 | 6.6 | 12.8 | 2.4 | 13.0 | 14.3 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.1 | 4.6 | 7.5 | 2.3 | 8.1 | 9.0 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 3.8 | 6.0 | 1.8 | 6.7 | 7.4 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.8 | 3.0 | 4.5 | 1.5 | 5.0 | 5.5 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.6 | 2.8 | 3.9 | 1.3 | 4.2 | 4.7 | ns |
| C_L = 15 pF | | | | | | | | | |
| t _{pd} | propagation delay | I0, I1 or S to Y; see Fig. 9 [2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 27.2 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.1 | 7.4 | 14.3 | 2.7 | 14.8 | 16.3 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.4 | 5.1 | 8.5 | 2.6 | 9.2 | 10.2 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.3 | 4.2 | 6.8 | 2.0 | 7.6 | 8.4 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.1 | 3.5 | 5.1 | 1.8 | 5.7 | 6.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.9 | 3.2 | 4.5 | 1.6 | 4.9 | 5.4 | ns |
| C_L = 30 pF | | | | | | | | | |
| t _{pd} | propagation delay | I0, I1 or S to Y; see Fig. 9 [2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 35.3 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.1 | 9.6 | 19.1 | 3.5 | 19.9 | 21.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.2 | 6.7 | 11.1 | 3.3 | 12.1 | 13.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 3.0 | 5.5 | 8.9 | 2.6 | 10.1 | 11.2 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.8 | 4.6 | 6.6 | 2.5 | 7.5 | 8.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.6 | 4.3 | 6.0 | 2.3 | 6.4 | 7.1 | 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 | - | 2.7 | - | - | - | - | pF |
| | | V _{CC} = 1.4 V to 1.6 V | - | 2.8 | - | - | - | - | pF |
| | | V _{CC} = 1.65 V to 1.95 V | - | 2.9 | - | - | - | - | pF |
| | | V _{CC} = 2.3 V to 2.7 V | - | 3.4 | - | - | - | - | 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 μ W).

$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$$

f_i = input frequency in MHz;

f_o = output frequency in MHz;

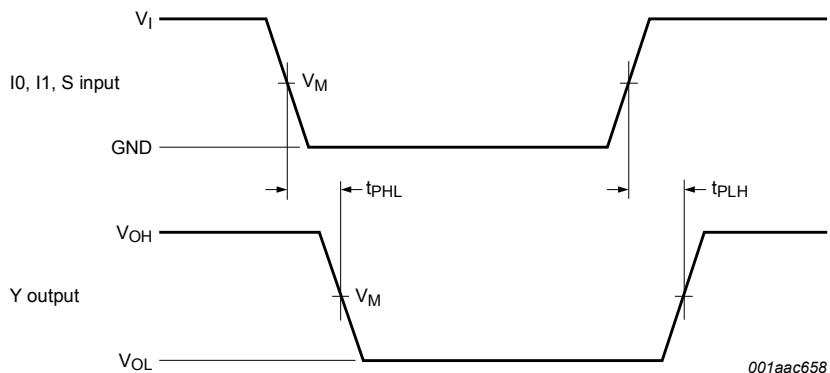
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

$$\sum(C_L \times V_{CC}^2 \times f_o) = \text{sum of the outputs.}$$

11.1. Waveforms and test circuit



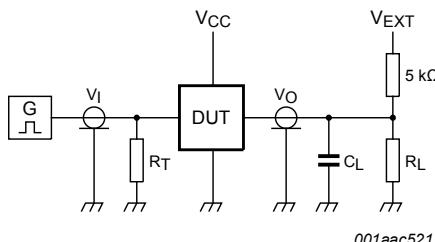
Measurement points are given in [Table 9](#).

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

Fig. 9. The data inputs (I0, I1) and common data select input (S) 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 | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | V_{CC} | $\leq 3.0 \text{ ns}$ |



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. 10. Test circuit for measuring switching times

Table 10. Test data

| Supply voltage | Load | V_{EXT} |
|----------------|------------------------------|--------------------|
| V_{CC} | C_L | t_{PLH}, t_{PHL} |
| 0.8 V to 3.6 V | 5 pF, 10 pF, 15 pF and 30 pF | t_{PZH}, t_{PHZ} |

[1] For measuring enable and disable times $R_L = 5 \text{ k}\Omega$,
for measuring propagation delays, set-up and hold times and pulse width $R_L = 1 \text{ M}\Omega$.

12. Package outline

Plastic surface-mounted package; 6 leads

SOT363

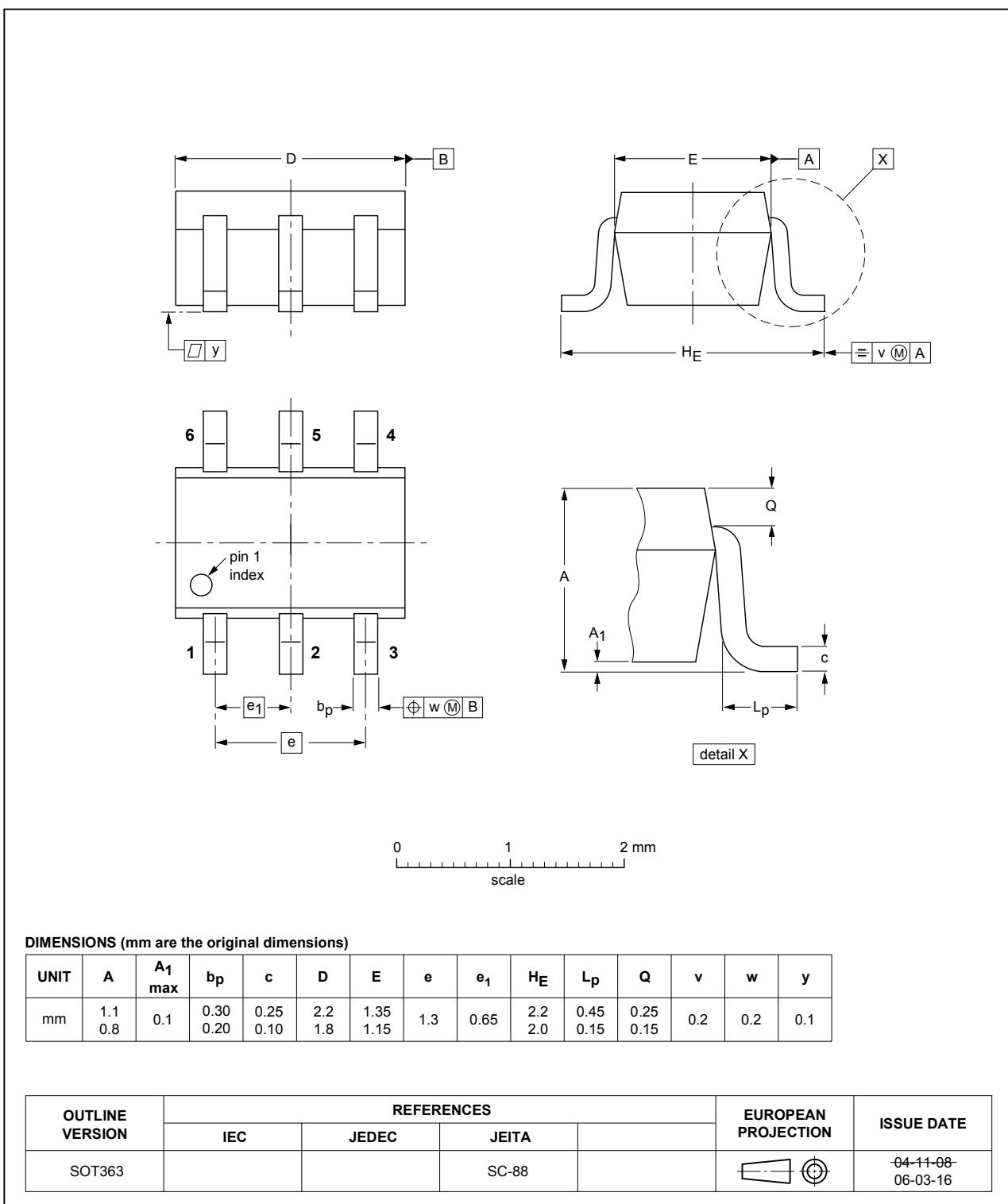
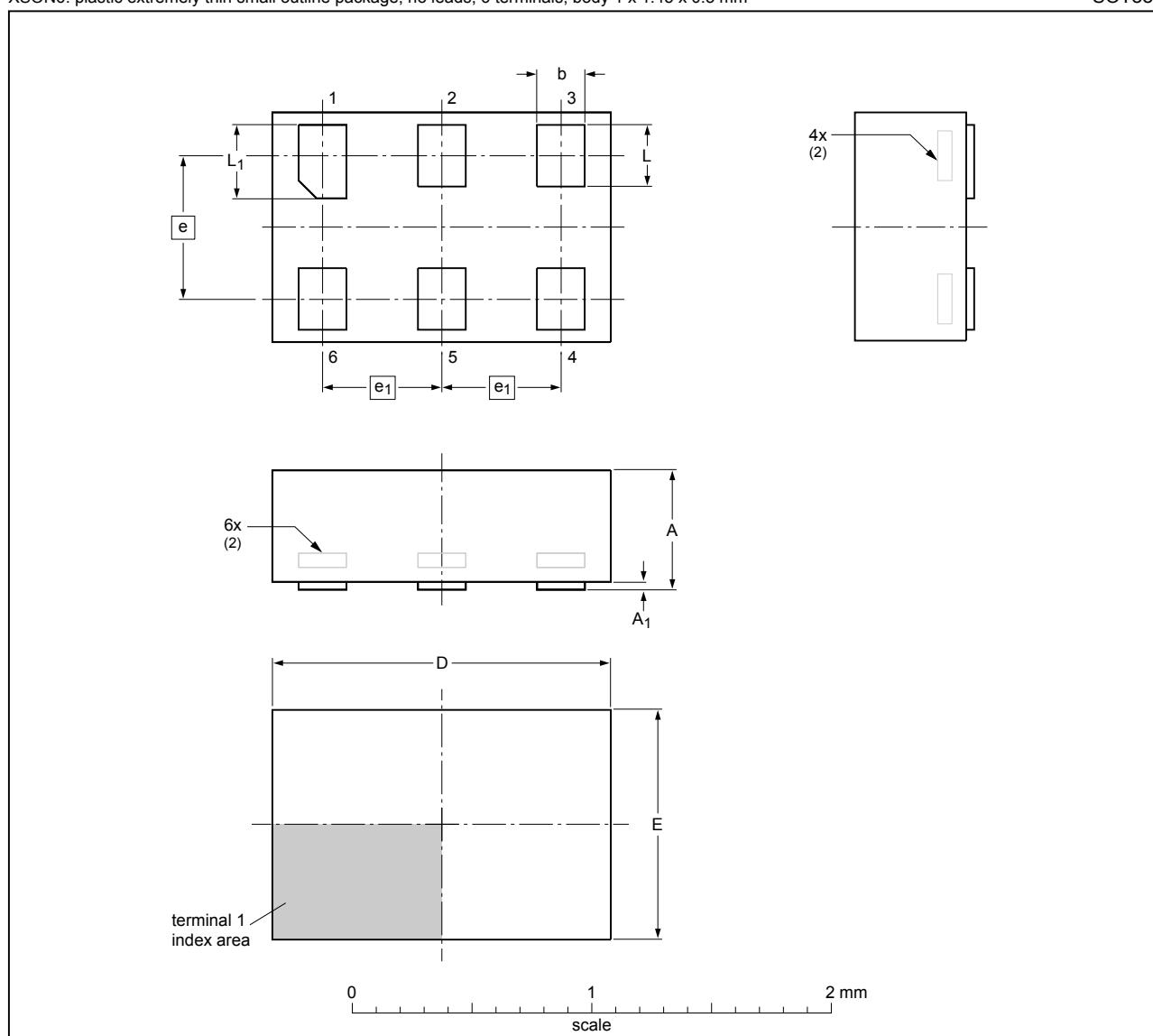


Fig. 11. Package outline SOT363 (SC-88)

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

SOT886



Dimensions (mm are the original dimensions)

| Unit | $A^{(1)}$ | A_1 | b | D | E | e | e_1 | L | L_1 |
|------|-----------|-------|------|------|------|------|-------|------|-------|
| mm | max | 0.5 | 0.04 | 0.25 | 1.50 | 1.05 | | 0.35 | 0.40 |
| mm | nom | | | 0.20 | 1.45 | 1.00 | 0.6 | 0.30 | 0.35 |
| mm | min | | | 0.17 | 1.40 | 0.95 | | 0.27 | 0.32 |

Notes

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

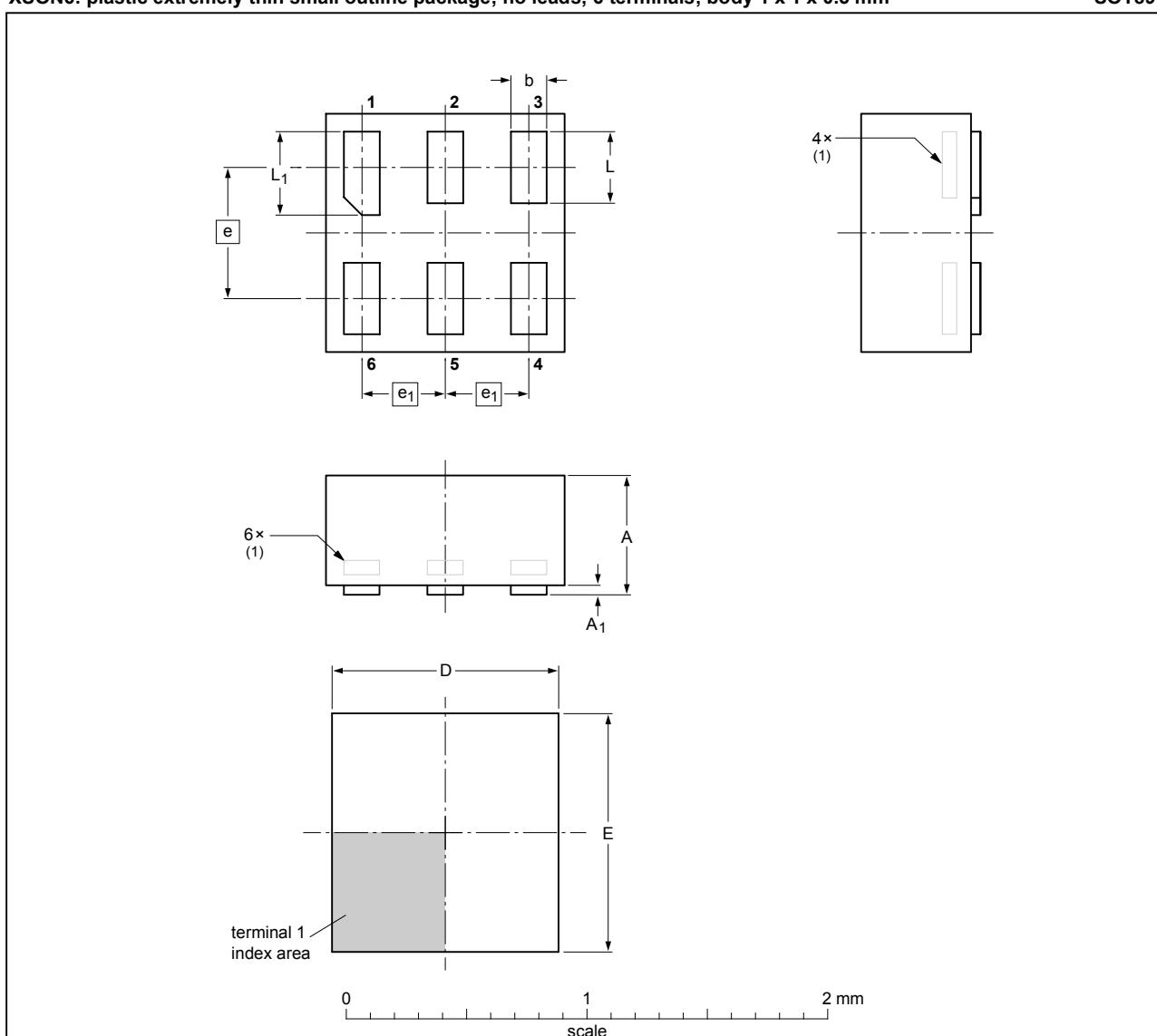
sot886_po

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

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



DIMENSIONS (mm are the original dimensions)

| UNIT | A max | A1 max | b | D | E | e | e1 | L | L1 |
|------|----------|-----------|--------------|--------------|--------------|------|------|--------------|--------------|
| mm | 0.5 | 0.04 | 0.20 0.12 | 1.05 0.95 | 1.05 0.95 | 0.55 | 0.35 | 0.35 0.27 | 0.40 0.32 |

Note

1. Can be visible in some manufacturing processes.

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

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

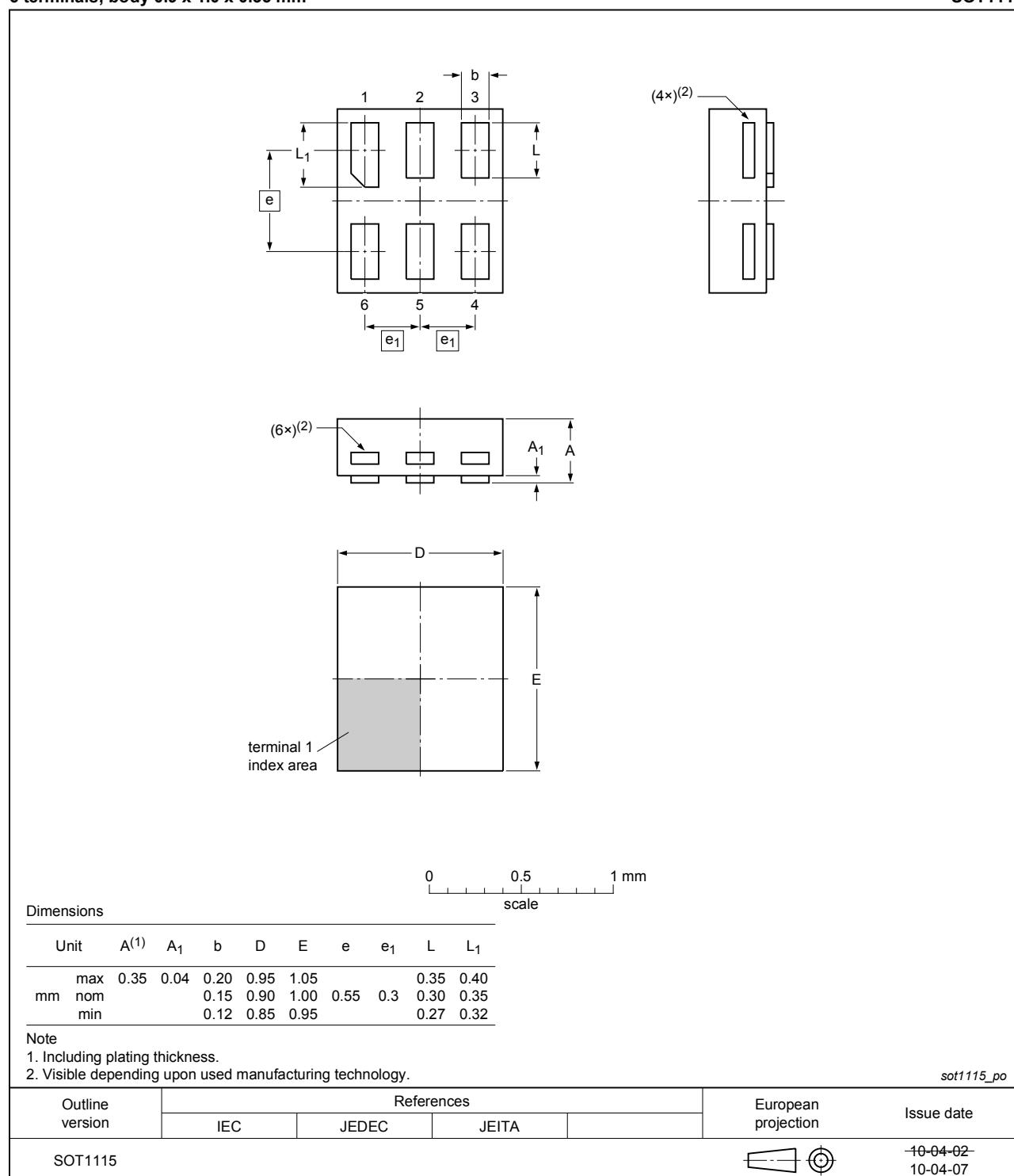


Fig. 14. Package outline SOT1115 (XSON6)

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

SOT1202

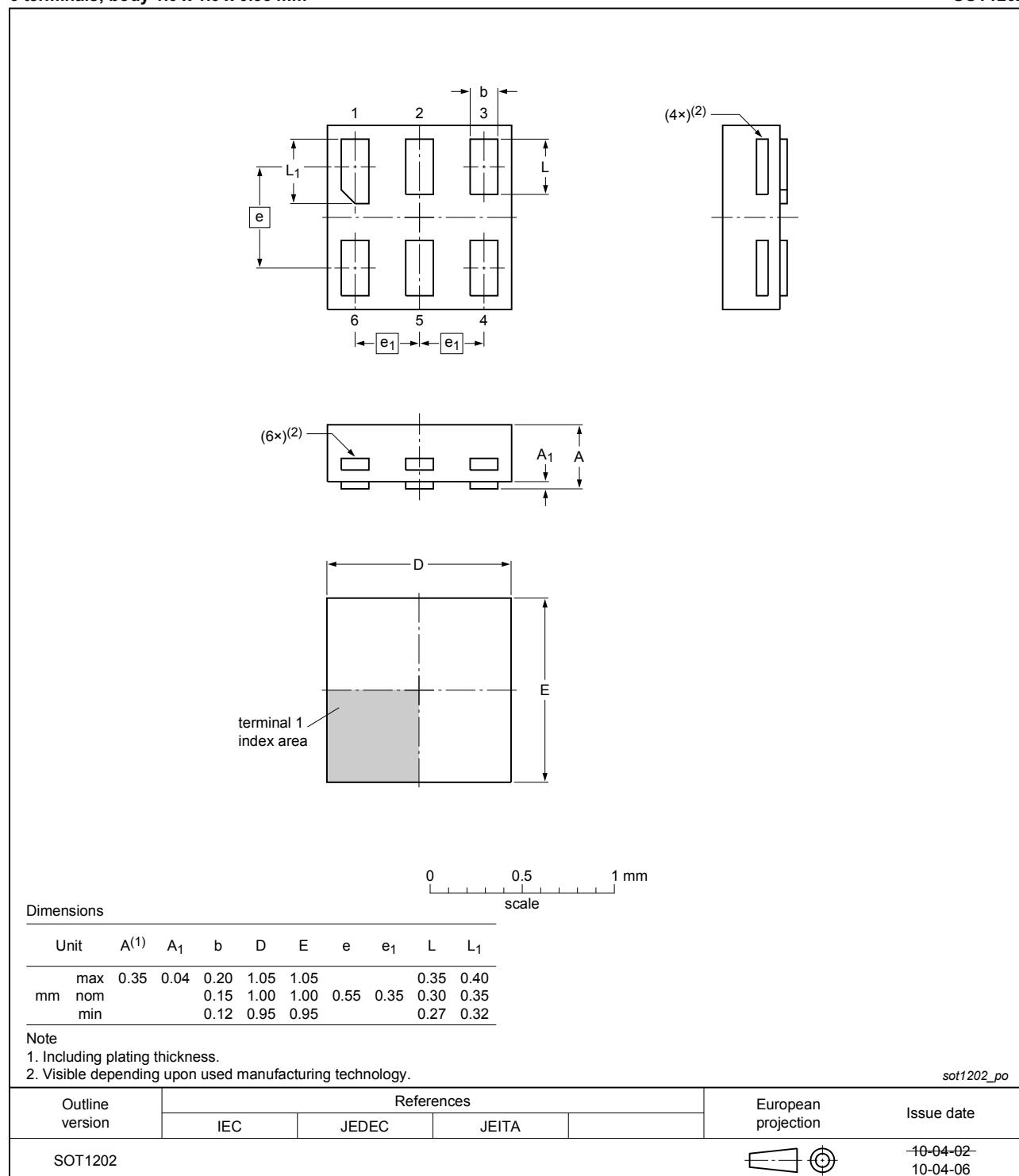


Fig. 15. Package outline SOT1202 (XSON6)

X2SON6: plastic thermal enhanced extremely thin small outline package; no leads; 6 terminals; body 1.0 x 0.8 x 0.35 mm

SOT1255

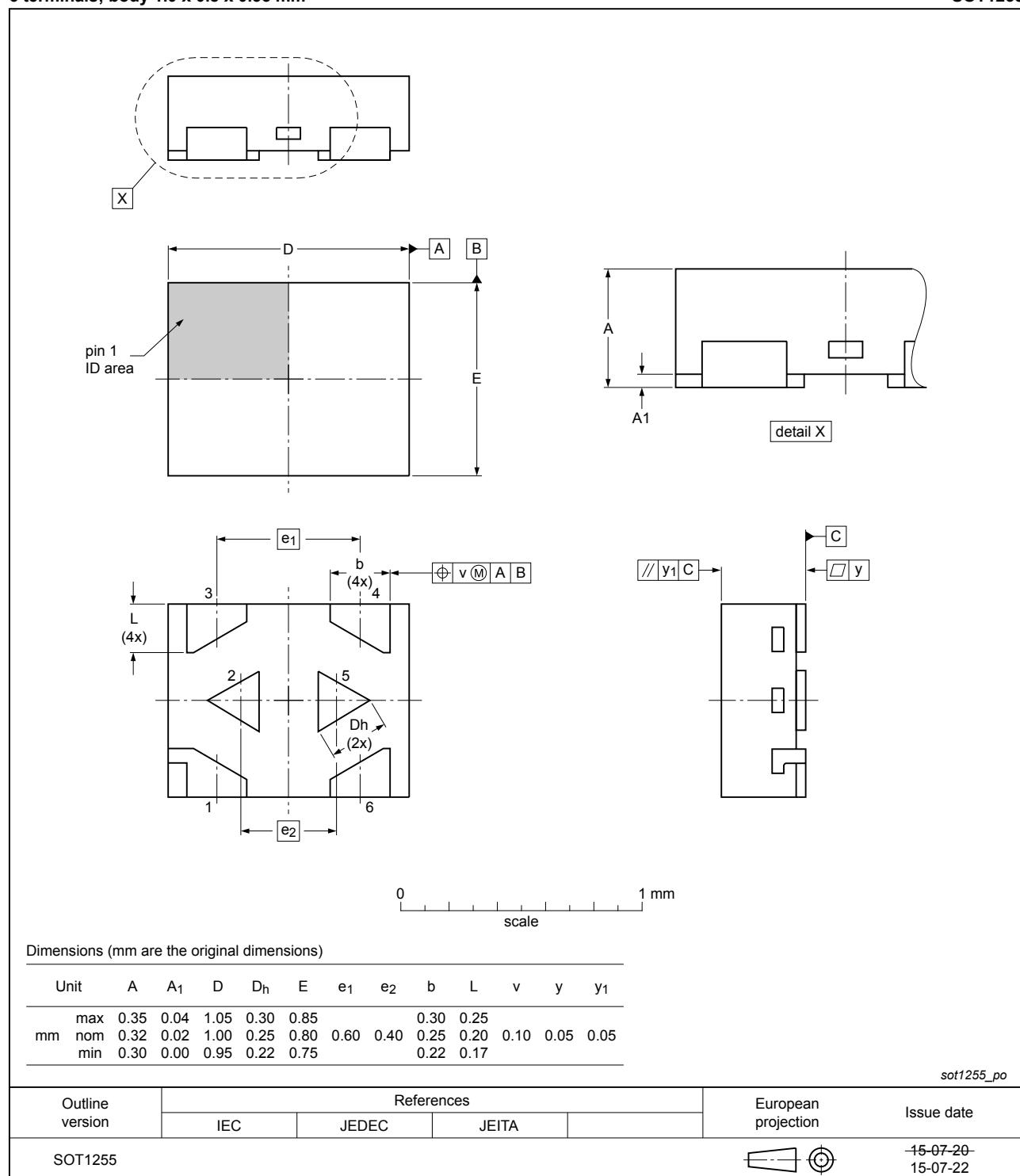


Fig. 16. Package outline SOT1255 (X2SON6)

13. Abbreviations

Table 11. Abbreviations

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

14. Revision history

Table 12. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|--------------------|---------------|----------------|
| 74AUP1G157 v.7 | 20190128 | Product data sheet | - | 74AUP1G157 v.6 |
| 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. | | | |
| 74AUP1G157 v.6 | 20150916 | Product data sheet | - | 74AUP1G157 v.5 |
| Modifications: | <ul style="list-style-type: none"> Added type number 74AUP1G157GX (SOT1255/X2SON6). | | | |
| 74AUP1G157 v.5 | 20120622 | Product data sheet | - | 74AUP1G157 v.4 |
| Modifications: | <ul style="list-style-type: none"> Package outline drawing of SOT886 (Fig. 12) modified. | | | |
| 74AUP1G157 v.4 | 20111129 | Product data sheet | - | 74AUP1G157 v.3 |
| Modifications: | <ul style="list-style-type: none"> Legal pages updated. | | | |
| 74AUP1G157 v.3 | 20101028 | Product data sheet | - | 74AUP1G157 v.2 |
| 74AUP1G157 v.2 | 20080205 | Product data sheet | - | 74AUP1G157 v.1 |
| 74AUP1G157 v.1 | 20061109 | Product data sheet | - | - |

15. 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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