

74AUP1G08

Low-power 2-input AND gate

Rev. 7 — 30 November 2017

Product data sheet

1 General description

The 74AUP1G08 provides the single 2-input AND function.

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

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3 Ordering information

Table 1. Ordering information

| Type number | Package | | | Version |
|-------------|-------------------|--------|--|----------|
| | Temperature range | Name | Description | |
| 74AUP1G08GW | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm | SOT353-1 |
| 74AUP1G08GM | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm | SOT886 |
| 74AUP1G08GF | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm | SOT891 |
| 74AUP1G08GN | -40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm | SOT1115 |
| 74AUP1G08GS | -40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm | SOT1202 |
| 74AUP1G08GX | -40 °C to +125 °C | X2SON5 | X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm | SOT1226 |

4 Marking

Table 2. Marking

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| 74AUP1G08GW | pE |
| 74AUP1G08GM | pE |
| 74AUP1G08GF | pE |
| 74AUP1G08GN | pE |
| 74AUP1G08GS | pE |
| 74AUP1G08GX | pE |

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

5 Functional diagram

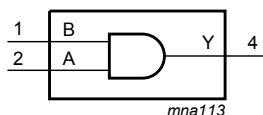


Figure 1. Logic symbol

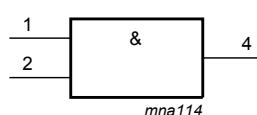


Figure 2. IEC logic symbol

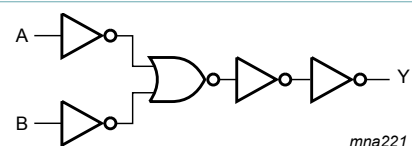


Figure 3. Logic diagram

6 Pinning information

6.1 Pinning

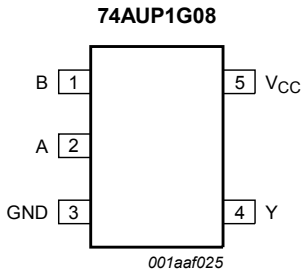


Figure 4. Pin configuration SOT353-1 (TSSOP5)

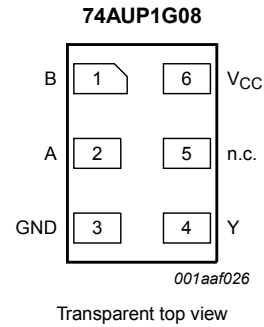


Figure 5. Pin configuration SOT886 (XSON6)

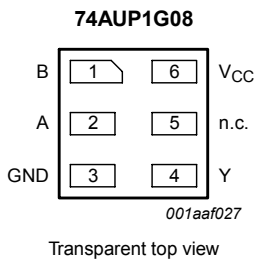


Figure 6. Pin configuration SOT891, SOT1115 and SOT1202 (XSON6)

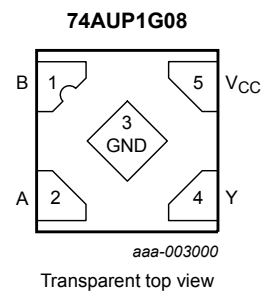


Figure 7. Pin configuration SOT1226 (X2SON5)

6.2 Pin description

Table 3. Pin description

| Symbol | Pin | | Description |
|-----------------|-------------------|-------|----------------|
| | TSSOP5 and X2SON5 | XSON6 | |
| B | 1 | 1 | data 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

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

| Input | | Output |
|-------|---|--------|
| A | B | Y |
| L | L | L |
| L | H | L |
| H | L | L |
| H | 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 [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 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 _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 |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|--------------------------------------|---|----------------------|------------|----------------------|---------------|
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 0.6 \text{ V}$; $I_O = 0 \text{ A}$; $V_{CC} = 3.3 \text{ V}$ [1] | - | - | 40 | μA |
| C_I | input capacitance | $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$; $V_I = \text{GND or } V_{CC}$ | - | 0.8 | - | pF |
| C_O | output capacitance | $V_O = \text{GND}$; $V_{CC} = 0 \text{ V}$ | - | 1.7 | - | pF |
| $T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 0.8 \text{ V}$ | $0.70 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$ | $0.65 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$ | 1.6 | - | - | V |
| | | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 0.8 \text{ V}$ | - | - | $0.30 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$ | - | - | $0.35 \times V_{CC}$ | V |
| | | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$ | - | - | 0.7 | V |
| | | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ | - | - | 0.9 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}$ | | | | |
| | | $I_O = -20 \mu\text{A}$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | $V_{CC} - 0.1$ | - | - | V |
| | | $I_O = -1.1 \text{ mA}$; $V_{CC} = 1.1 \text{ V}$ | $0.7 \times V_{CC}$ | - | - | V |
| | | $I_O = -1.7 \text{ mA}$; $V_{CC} = 1.4 \text{ V}$ | 1.03 | - | - | V |
| | | $I_O = -1.9 \text{ mA}$; $V_{CC} = 1.65 \text{ V}$ | 1.30 | - | - | V |
| | | $I_O = -2.3 \text{ mA}$; $V_{CC} = 2.3 \text{ V}$ | 1.97 | - | - | V |
| | | $I_O = -3.1 \text{ mA}$; $V_{CC} = 2.3 \text{ V}$ | 1.85 | - | - | V |
| | | $I_O = -2.7 \text{ mA}$; $V_{CC} = 3.0 \text{ V}$ | 2.67 | - | - | V |
| $I_O = -4.0 \text{ mA}$; $V_{CC} = 3.0 \text{ V}$ | 2.55 | - | - | V | | |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}$ | | | | |
| | | $I_O = 20 \mu\text{A}$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | - | - | 0.1 | V |
| | | $I_O = 1.1 \text{ mA}$; $V_{CC} = 1.1 \text{ V}$ | - | - | $0.3 \times V_{CC}$ | V |
| | | $I_O = 1.7 \text{ mA}$; $V_{CC} = 1.4 \text{ V}$ | - | - | 0.37 | V |
| | | $I_O = 1.9 \text{ mA}$; $V_{CC} = 1.65 \text{ V}$ | - | - | 0.35 | V |
| | | $I_O = 2.3 \text{ mA}$; $V_{CC} = 2.3 \text{ V}$ | - | - | 0.33 | V |
| | | $I_O = 3.1 \text{ mA}$; $V_{CC} = 2.3 \text{ V}$ | - | - | 0.45 | V |
| | | $I_O = 2.7 \text{ mA}$; $V_{CC} = 3.0 \text{ V}$ | - | - | 0.33 | V |
| $I_O = 4.0 \text{ mA}$; $V_{CC} = 3.0 \text{ V}$ | - | - | 0.45 | V | | |
| I_I | input leakage current | $V_I = \text{GND to } 3.6 \text{ V}$; $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$ | - | - | ± 0.5 | μA |
| I_{OFF} | power-off leakage current | $V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}$; $V_{CC} = 0 \text{ V}$ | - | - | ± 0.5 | μA |
| ΔI_{OFF} | additional power-off leakage current | $V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}$; $V_{CC} = 0 \text{ V to } 0.2 \text{ V}$ | - | - | ± 0.6 | μA |
| I_{CC} | supply current | $V_I = \text{GND or } V_{CC}$; $I_O = 0 \text{ A}$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | - | - | 0.9 | μA |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|--------------------------------------|---|----------------------|-----|----------------------|---------------|
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 0.6 \text{ V}$; $I_O = 0 \text{ A}$; $V_{CC} = 3.3 \text{ V}$ [1] | - | - | 50 | μA |
| $T_{amb} = -40 \text{ }^\circ\text{C}$ to $+125 \text{ }^\circ\text{C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 0.8 \text{ V}$ | $0.75 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 0.9 \text{ V}$ to 1.95 V | $0.70 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 2.3 \text{ V}$ to 2.7 V | 1.6 | - | - | V |
| | | $V_{CC} = 3.0 \text{ V}$ to 3.6 V | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 0.8 \text{ V}$ | - | - | $0.25 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9 \text{ V}$ to 1.95 V | - | - | $0.30 \times V_{CC}$ | V |
| | | $V_{CC} = 2.3 \text{ V}$ to 2.7 V | - | - | 0.7 | V |
| | | $V_{CC} = 3.0 \text{ V}$ to 3.6 V | - | - | 0.9 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20 \mu\text{A}$; $V_{CC} = 0.8 \text{ V}$ to 3.6 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 |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = 20 \mu\text{A}$; $V_{CC} = 0.8 \text{ V}$ to 3.6 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_I | input leakage current | $V_I = \text{GND}$ to 3.6 V ; $V_{CC} = 0 \text{ V}$ to 3.6 V | - | - | ± 0.75 | μA |
| | | V_I or $V_O = 0 \text{ V}$ to 3.6 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 V ; $V_{CC} = 0 \text{ V}$ to 0.2 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 V | - | - | 1.4 | μA |
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 0.6 \text{ V}$; $I_O = 0 \text{ A}$; $V_{CC} = 3.3 \text{ V}$ [1] | - | - | 75 | μA |

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

11 Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#)

| Symbol | Parameter | Conditions | Min | Typ ^[1] | Max | Unit |
|---|-------------------|--|-----|--------------------|------|------|
| T_{amb} = 25 °C; C_L = 5 pF | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 8 ^[2] | | | | |
| | | V _{CC} = 0.8 V | - | 17.0 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.6 | 5.1 | 10.8 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.6 | 3.7 | 6.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.3 | 3.0 | 5.2 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.1 | 2.4 | 4.0 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.0 | 2.2 | 3.5 | ns |
| T_{amb} = 25 °C; C_L = 10 pF | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 8 ^[2] | | | | |
| | | V _{CC} = 0.8 V | - | 20.6 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.4 | 6.0 | 12.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.0 | 4.3 | 7.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.7 | 3.6 | 6.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.4 | 2.9 | 4.8 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.3 | 2.7 | 4.2 | ns |
| T_{amb} = 25 °C; C_L = 15 pF | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 8 ^[2] | | | | |
| | | V _{CC} = 0.8 V | - | 24.1 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.4 | 6.8 | 14.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.3 | 4.9 | 8.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.9 | 4.0 | 6.9 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.7 | 3.4 | 5.5 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.5 | 3.1 | 4.8 | ns |
| T_{amb} = 25 °C; C_L = 30 pF | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 8 ^[2] | | | | |
| | | V _{CC} = 0.8 V | - | 34.4 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.6 | 9.1 | 19.4 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.4 | 6.4 | 11.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.6 | 5.3 | 9.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.3 | 4.5 | 7.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.2 | 4.2 | 6.2 | ns |

| 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} ^[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 | - | 2.9 | - | 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).
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ 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;
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

Table 9. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#)

| 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, B to Y; see Figure 8 ^[1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 2.1 | 11.7 | 2.1 | 12.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.5 | 7.5 | 1.5 | 8.3 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.3 | 6.1 | 1.3 | 6.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.0 | 4.8 | 1.0 | 5.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 0.9 | 4.3 | 0.9 | 4.8 | ns |
| C_L = 10 pF | | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 8 ^[1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 2.2 | 13.6 | 2.2 | 15.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.8 | 8.9 | 1.8 | 9.8 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.6 | 7.2 | 1.6 | 7.9 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.3 | 5.7 | 1.3 | 6.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.2 | 4.7 | 1.2 | 5.2 | ns |

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|------------------------------|-------------------|---|------------------|------|-------------------|------|------|
| | | | Min | Max | Min | Max | |
| C_L = 15 pF | | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 8 [1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 3.1 | 15.7 | 3.1 | 17.3 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.1 | 10.1 | 2.1 | 11.2 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.8 | 8.2 | 1.8 | 9.0 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.6 | 6.5 | 1.6 | 7.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.5 | 5.9 | 1.5 | 6.5 | ns |
| C_L = 30 pF | | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 8 [1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 4.1 | 21.8 | 4.1 | 24.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.9 | 13.6 | 2.9 | 15.0 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.4 | 10.9 | 2.4 | 12.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.2 | 8.6 | 2.2 | 9.5 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.1 | 7.5 | 2.1 | 8.3 | ns |

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

11.1 Waveforms and test circuit

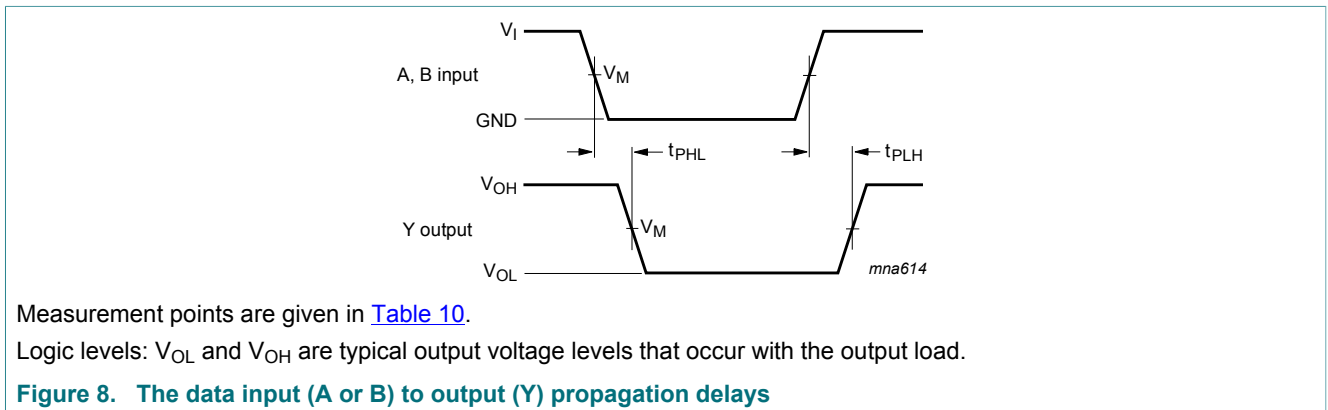
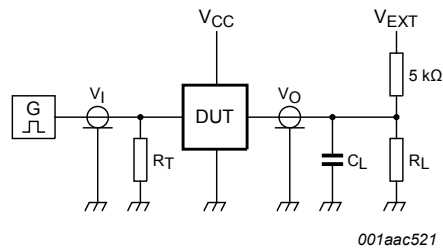


Table 10. Measurement points

| 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 11](#).

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.

Figure 9. Test circuit for measuring switching times

Table 11. Test data

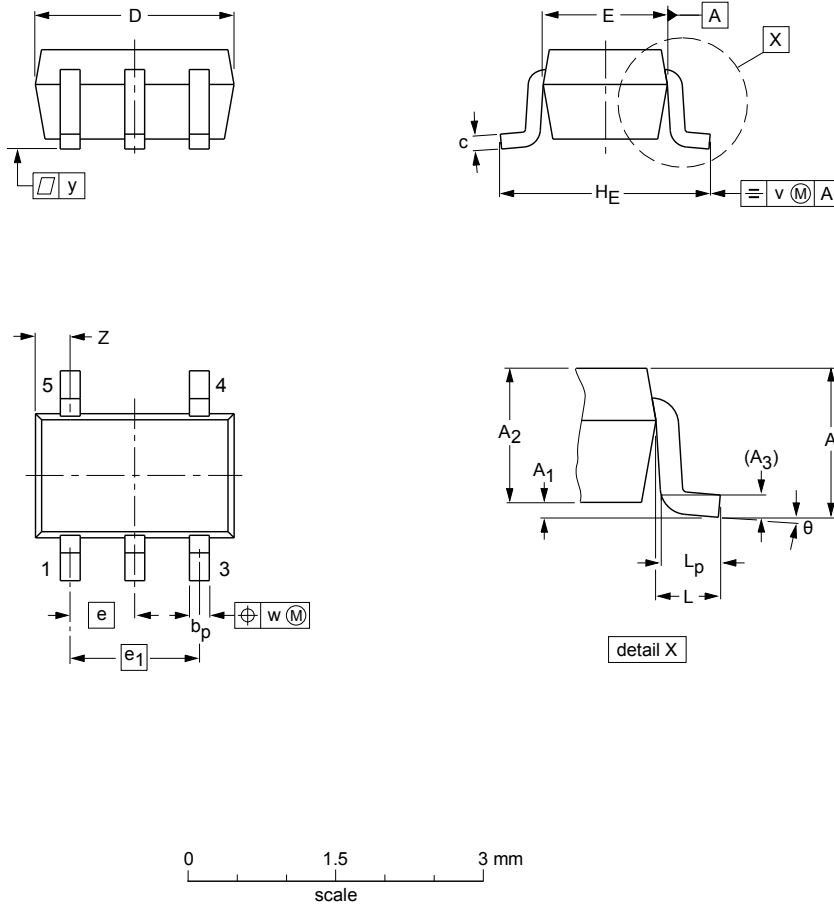
| Supply voltage | Load | | V_{EXT} | | |
|----------------|------------------------------|--------------|-----------------------|-----------------------|-----------------------|
| V_{CC} | C_L | R_L [1] | t_{PLH} , t_{PHL} | t_{PZH} , t_{PHZ} | t_{PZL} , t_{PLZ} |
| 0.8 V to 3.6 V | 5 pF, 10 pF, 15 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 Package outline

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

SOT353-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | A ₁ | A ₂ | A ₃ | b _p | c | D ⁽¹⁾ | E ⁽¹⁾ | e | e ₁ | H _E | L | L _p | v | w | y | Z ⁽¹⁾ | θ |
|------|--------|----------------|----------------|----------------|----------------|--------------|------------------|------------------|------|----------------|----------------|-------|----------------|-----|-----|-----|------------------|----------|
| mm | 1.1 | 0.1 0 | 1.0 0.8 | 0.15 | 0.30 0.15 | 0.25 0.08 | 2.25 1.85 | 1.35 1.15 | 0.65 | 1.3 | 2.25 2.0 | 0.425 | 0.46 0.21 | 0.3 | 0.1 | 0.1 | 0.60 0.15 | 7° 0° |

Note

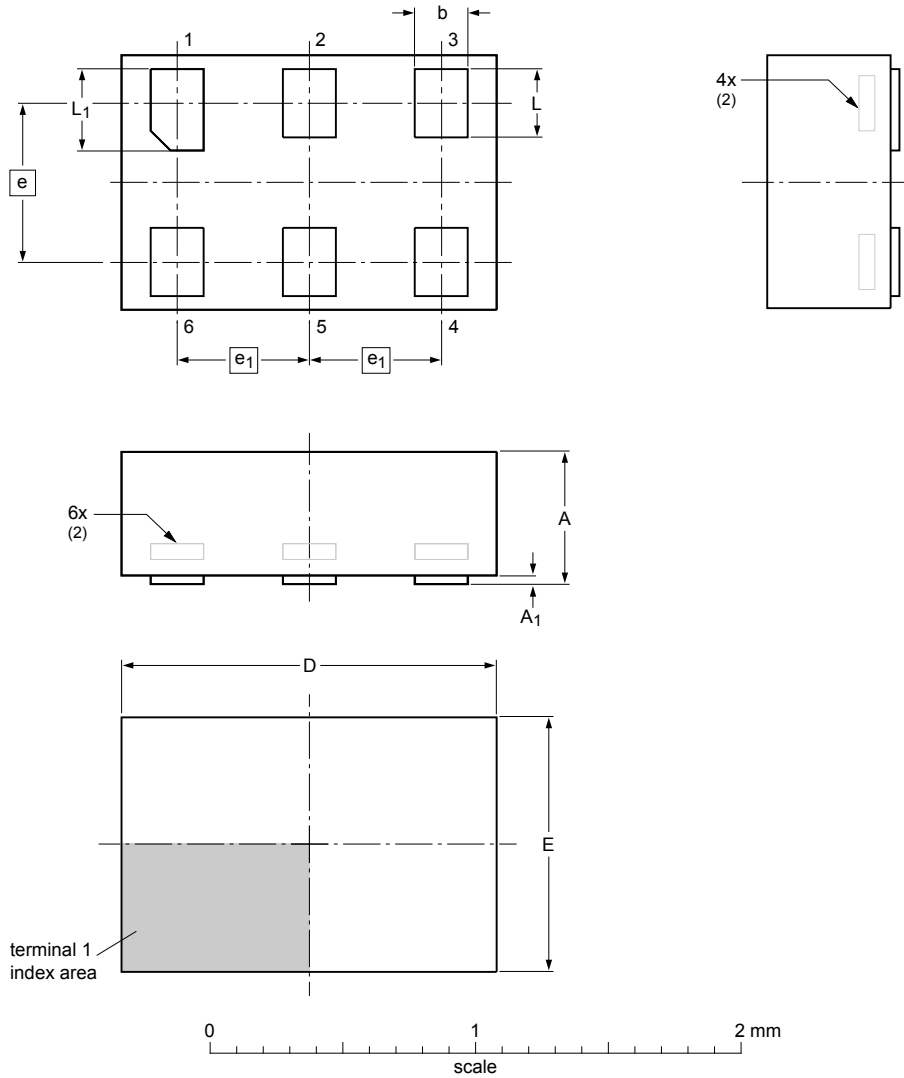
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|--------|--------|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT353-1 | | MO-203 | SC-88A | | 00-09-01 03-02-19 |

Figure 10. 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



Dimensions (mm are the original dimensions)

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

Notes

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

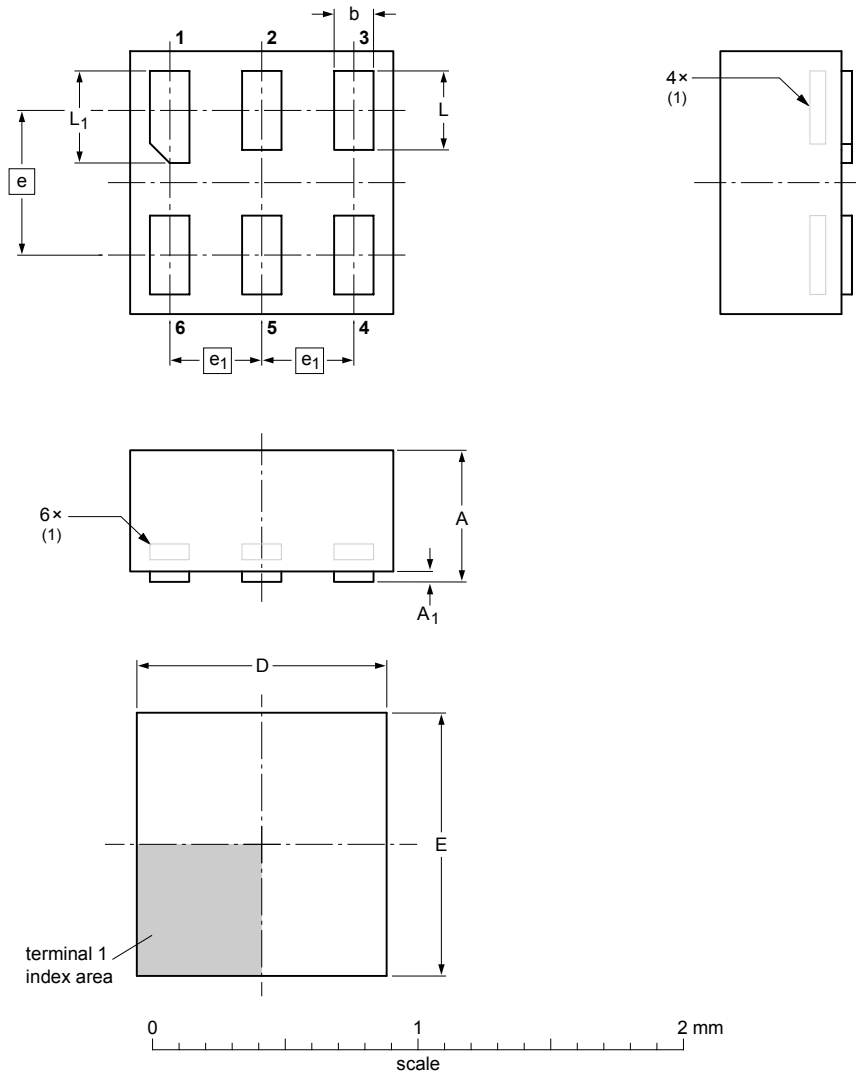
sot886_po

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

Figure 11. 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 | A ₁ max | b | D | E | e | e ₁ | L | L ₁ |
|------|----------|-----------------------|--------------|--------------|--------------|------|----------------|--------------|----------------|
| 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

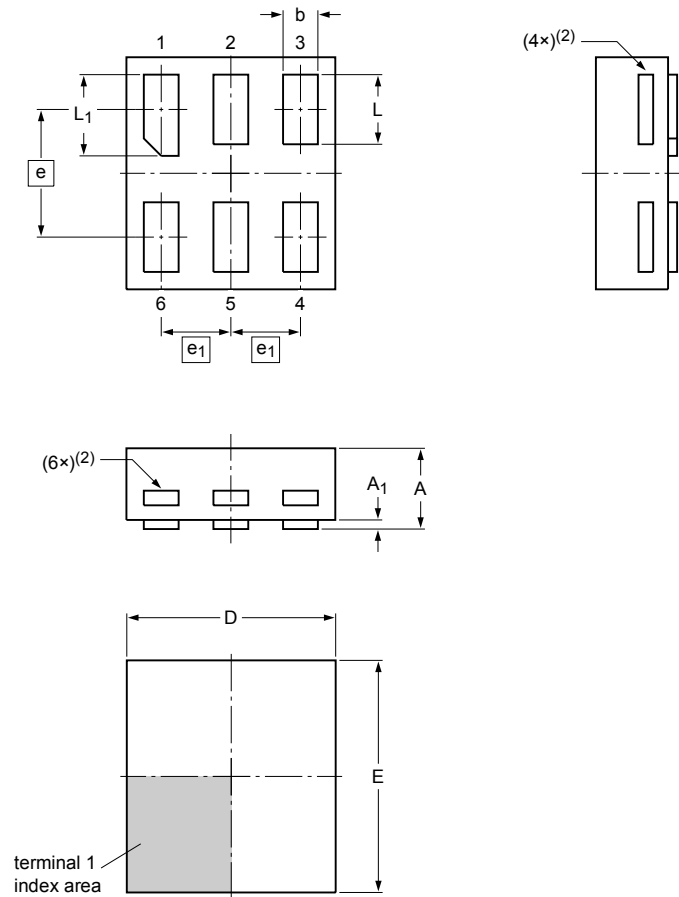
1. Can be visible in some manufacturing processes.

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

Figure 12. 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



Dimensions

| Unit | A ⁽¹⁾ | A ₁ | b | D | E | e | e ₁ | L | L ₁ |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| mm | max 0.35 | 0.04 | 0.20 | 0.95 | 1.05 | | | 0.35 | 0.40 |
| | nom | | 0.15 | 0.90 | 1.00 | 0.55 | 0.3 | 0.30 | 0.35 |
| | min | | 0.12 | 0.85 | 0.95 | | | 0.27 | 0.32 |

Note

- Including plating thickness.
- Visible depending upon used manufacturing technology.

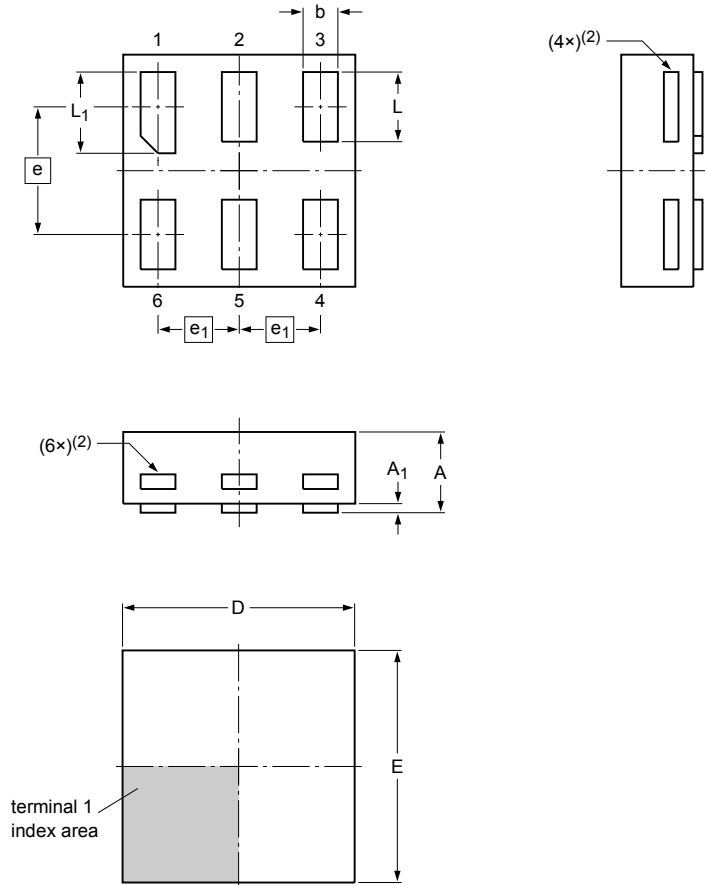
sot1115_po

| Outline version | References | | | | European projection | Issue date |
|-----------------|------------|-------|-------|--|---------------------|------------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT1115 | | | | | | -10-04-02- 10-04-07 |

Figure 13. 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



Dimensions

| Unit | A ⁽¹⁾ | A ₁ | b | D | E | e | e ₁ | L | L ₁ |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| mm | max 0.35 | 0.04 | 0.20 | 1.05 | 1.05 | | | 0.35 | 0.40 |
| | nom 0.15 | 1.00 | 1.00 | 0.55 | 0.35 | 0.30 | 0.35 | | |
| | min 0.12 | 0.95 | 0.95 | | | 0.27 | 0.32 | | |

Note

- Including plating thickness.
- Visible depending upon used manufacturing technology.

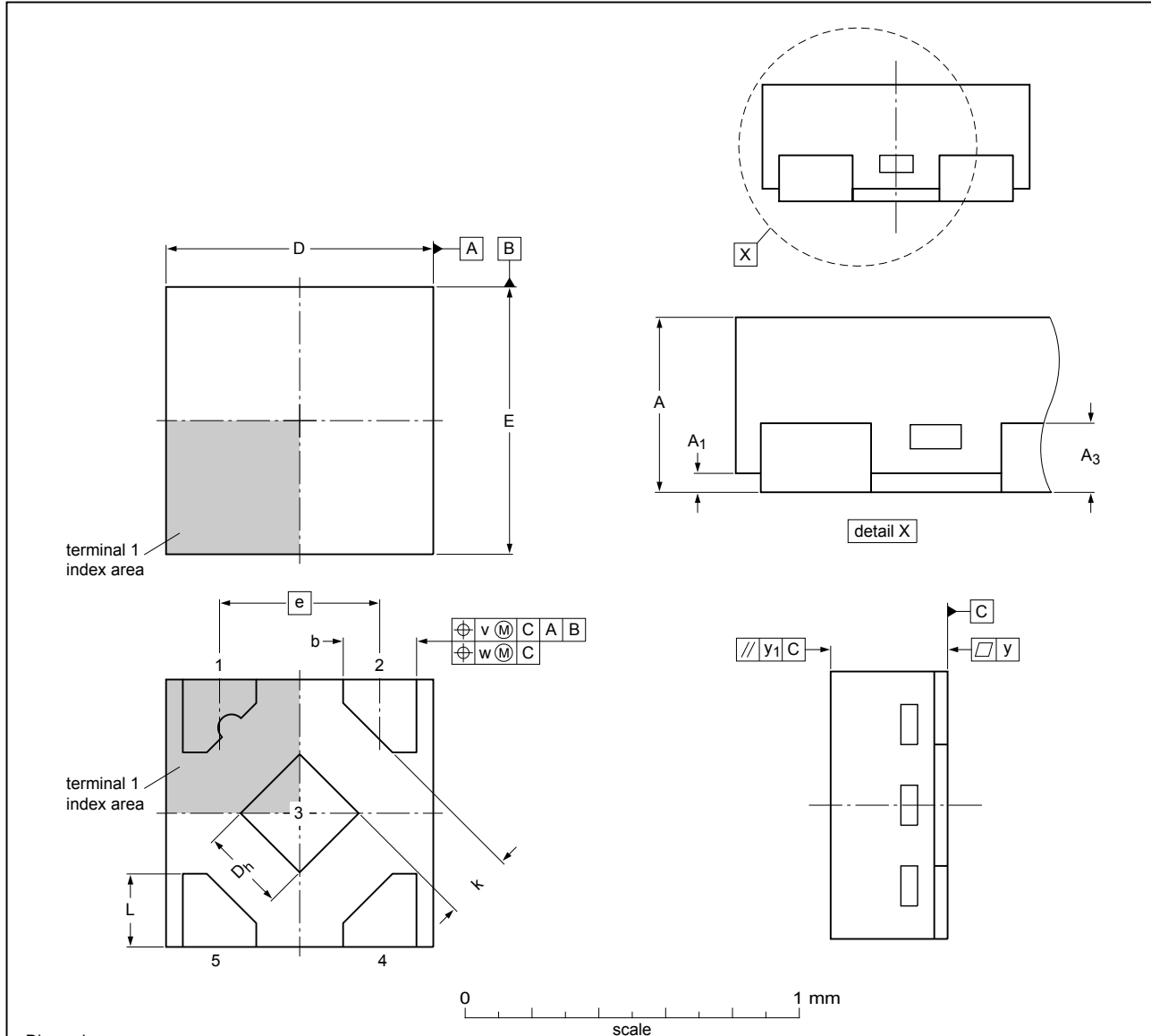
sot1202_po

| Outline version | References | | | | European projection | Issue date |
|-----------------|------------|-------|-------|--|---------------------|------------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT1202 | | | | | | -10-04-02- 10-04-06 |

Figure 14. 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



Dimensions

| Unit | A ⁽¹⁾ | A ₁ | A ₃ | D | D _h | E | b | e | k | L | v | w | y | y ₁ |
|--------|------------------|----------------|----------------|------|----------------|------|------|------|------|------|-----|------|------|----------------|
| max | 0.35 | 0.04 | 0.128 | 0.85 | 0.30 | 0.85 | 0.27 | | | 0.27 | | | | |
| mm nom | | | | 0.80 | 0.25 | 0.80 | 0.22 | 0.48 | | 0.22 | 0.1 | 0.05 | 0.05 | 0.05 |
| min | | | 0.040 | 0.75 | 0.20 | 0.75 | 0.17 | | 0.20 | 0.17 | | | | |

Note

1. Dimension A is including plating thickness.
2. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

sot1226_po

| Outline version | References | | | | European projection | Issue date |
|-----------------|------------|-------|------|--|---------------------|----------------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT1226 | | | | | | 12-04-10 12-04-25 |

Figure 15. Package outline SOT1226 (X2SON5)

13 Abbreviations

Table 12. 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 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|--------------------|---------------|---------------|
| 74AUP1G08 v.7 | 20171130 | Product data sheet | - | 74AUP1G08 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. | | | |
| 74AUP1G08 v.6 | 20120622 | Product data sheet | - | 74AUP1G08 v.5 |
| Modifications: | <ul style="list-style-type: none"> Package outline drawing of SOT1226 (Figure 15) modified. | | | |
| 74AUP1G08 v.5 | 20120412 | Product data sheet | - | 74AUP1G08 v.4 |
| Modifications: | <ul style="list-style-type: none"> Added type number 74AUP1G08GX (SOT1226) Package outline drawing of SOT886 (Figure 11) modified. | | | |
| 74AUP1G08 v.4 | 20111115 | Product data sheet | - | 74AUP1G08 v.3 |
| Modifications: | <ul style="list-style-type: none"> Legal pages updated. | | | |
| 74AUP1G08 v.3 | 20101007 | Product data sheet | - | 74AUP1G08 v.2 |
| 74AUP1G08 v.2 | 20060629 | Product data sheet | - | 74AUP1G08 v.1 |
| 74AUP1G08 v.1 | 20050720 | Product data sheet | - | - |

15 Legal information

15.1 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".

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