# 74AUP1G332

## Low-power 3-input OR-gate

Rev. 5 — 4 July 2012 Product data sheet

## 1. General description

The 74AUP1G332 provides a single 3-input OR gate.

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 μA (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

## 3. Ordering information

**Table 1. Ordering information**

| Type number | Package | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| 74AUP1G332GW | –40 °C to +125 °C | SC-88 | plastic surface-mounted package; 6 leads | SOT363 |
| 74AUP1G332GM | –40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm | SOT886 |
| 74AUP1G332GF | –40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm | SOT891 |
| 74AUP1G332GN | –40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm | SOT1115 |
| 74AUP1G332GS | –40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm | SOT1202 |

## 4. Marking

**Table 2. Marking**

| Type number | Marking code[1] |
|---|---|
| 74AUP1G332GW | aG |
| 74AUP1G332GM | aG |
| 74AUP1G332GF | aG |
| 74AUP1G332GN | aG |
| 74AUP1G332GS | aG |

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

## 5. Functional diagram

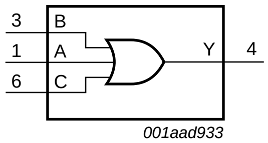



**Fig 1. Logic symbol**

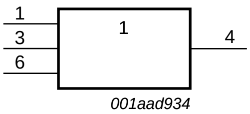



**Fig 2. IEC logic symbol**

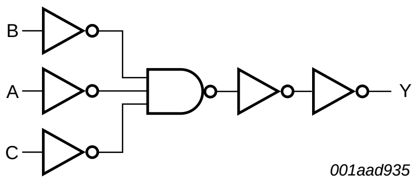



**Fig 3. Logic diagram**

# 6. Pinning information

## 6.1 Pinning

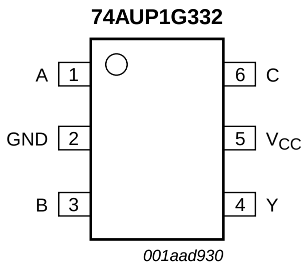
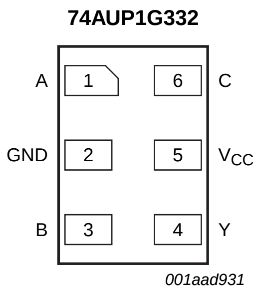
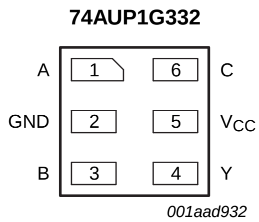



**Fig 4. Pin configuration SOT363**




Transparent top view

**Fig 5. Pin configuration SOT886**




Transparent top view

**Fig 6. Pin configuration SOT891, SOT1115 and SOT1202**

## 6.2 Pin description

**Table 3. Pin description**

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

# 7. Functional description

**Table 4. Function table[1]**

| Input | | | Output |
|---|---|---|---|
| **A** | **B** | **C** | **Y** |
| H | X | X | H |
| X | H | X | H |
| X | X | H | H |
| L | L | L | L |

[1] H = HIGH voltage level;
L = LOW voltage level;
X = don’t care.

## 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 SC-88 packages: above 87.5 °C the value of $P_{tot}$ derates linearly with 4.0 mW/K.
For 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 |
| $\Delta t/\Delta V$ | 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 |
| | | $I_O$ = −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 |
| $\Delta I_{OFF}$ | 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 |
| $\Delta I_{CC}$ | additional supply current | $V_I$ = $V_{CC}$ − 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 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 |

**Table 7. Static characteristics** *...continued*

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

| 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 |
| $\Delta I_{OFF}$ | 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 |
| $\Delta I_{CC}$ | additional supply current | $V_I$ = $V_{CC}$ − 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 50 | μA |

**Table 7. Static characteristics** *...continued*

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

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **$T_{amb}$ = −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 |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = −20 μA; $V_{CC}$ = 0.8 V to 3.6 V | | $V_{CC}$ − 0.11 | - | - | 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 | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O$ = 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 |
| $\Delta I_{OFF}$ | 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 |
| $\Delta I_{CC}$ | additional supply current | $V_I$ = $V_{CC}$ − 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 75 | μA |

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

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

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

| 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 pF** | | | | | | | | | | |
| $t_{pd}$ | propagation delay | A, B and C to Y; see Figure 7 | [2] | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 17.6 | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 2.3 | 5.2 | 10.2 | 2.0 | 10.3 | 10.3 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 1.7 | 3.7 | 6.0 | 1.9 | 6.4 | 6.6 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 1.6 | 3.0 | 4.7 | 1.4 | 5.2 | 5.4 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 1.4 | 2.3 | 3.3 | 1.2 | 3.7 | 3.9 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 1.2 | 2.1 | 2.9 | 1.1 | 3.1 | 3.3 | ns |
| **$C_L$ = 10 pF** | | | | | | | | | | |
| $t_{pd}$ | propagation delay | A, B and C to Y; see Figure 7 | [2] | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 17.6 | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 2.5 | 6.1 | 11.9 | 2.4 | 12.0 | 12.0 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 2.2 | 4.3 | 7.1 | 2.0 | 7.3 | 7.6 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 2.1 | 3.5 | 5.4 | 1.9 | 5.8 | 6.1 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 1.7 | 2.9 | 4.0 | 1.5 | 4.5 | 4.7 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 1.5 | 2.6 | 3.7 | 1.4 | 3.9 | 4.1 | ns |
| **$C_L$ = 15 pF** | | | | | | | | | | |
| $t_{pd}$ | propagation delay | A, B and C to Y; see Figure 7 | [2] | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 23.6 | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 2.9 | 6.9 | 13.5 | 2.7 | 13.6 | 13.6 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 2.5 | 4.9 | 7.8 | 2.4 | 8.5 | 8.8 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 2.2 | 4.0 | 6.2 | 2.1 | 6.8 | 7.1 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 2.0 | 3.3 | 4.7 | 1.6 | 5.2 | 5.4 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 1.9 | 3.1 | 4.2 | 1.7 | 4.5 | 4.8 | ns |
| **$C_L$ = 30 pF** | | | | | | | | | | |
| $t_{pd}$ | propagation delay | A, B and C to Y; see Figure 7 | [2] | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 36.3 | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 3.6 | 9.2 | 17.9 | 3.5 | 18.4 | 18.7 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 3.2 | 6.4 | 10.4 | 3.3 | 11.4 | 11.9 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 3.0 | 5.3 | 8.3 | 2.9 | 9.1 | 9.6 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 2.8 | 4.4 | 6.2 | 1.6 | 6.7 | 7.1 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 2.6 | 4.2 | 5.5 | 1.4 | 6.4 | 6.7 | ns |

**Table 8. Dynamic characteristics** *...continued*

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

| 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 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 | | - | 2.5 | - | - | - | - | 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).

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

$f_i$ = input frequency in MHz;

$f_o$ = output frequency in MHz;

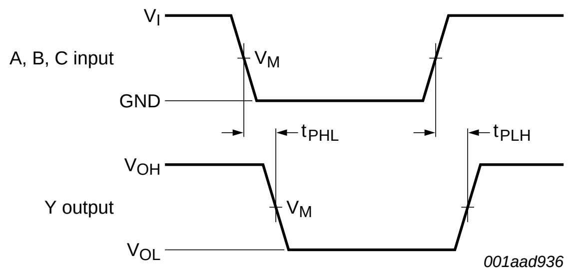
$C_L$ = load capacitance in pF;

$V_{CC}$ = supply voltage in V;

N = number of inputs switching;

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

## 12. Waveforms



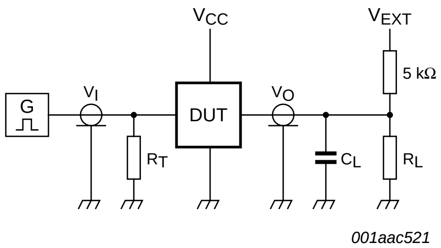

Measurement points are given in Table 9.

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

**Fig 7. Input A, B and C to output Y propagation delay times**

**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 × $V_{CC}$ | 0.5 × $V_{CC}$ | $V_{CC}$ | ≤ 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 8. Test circuit for measuring switching times**

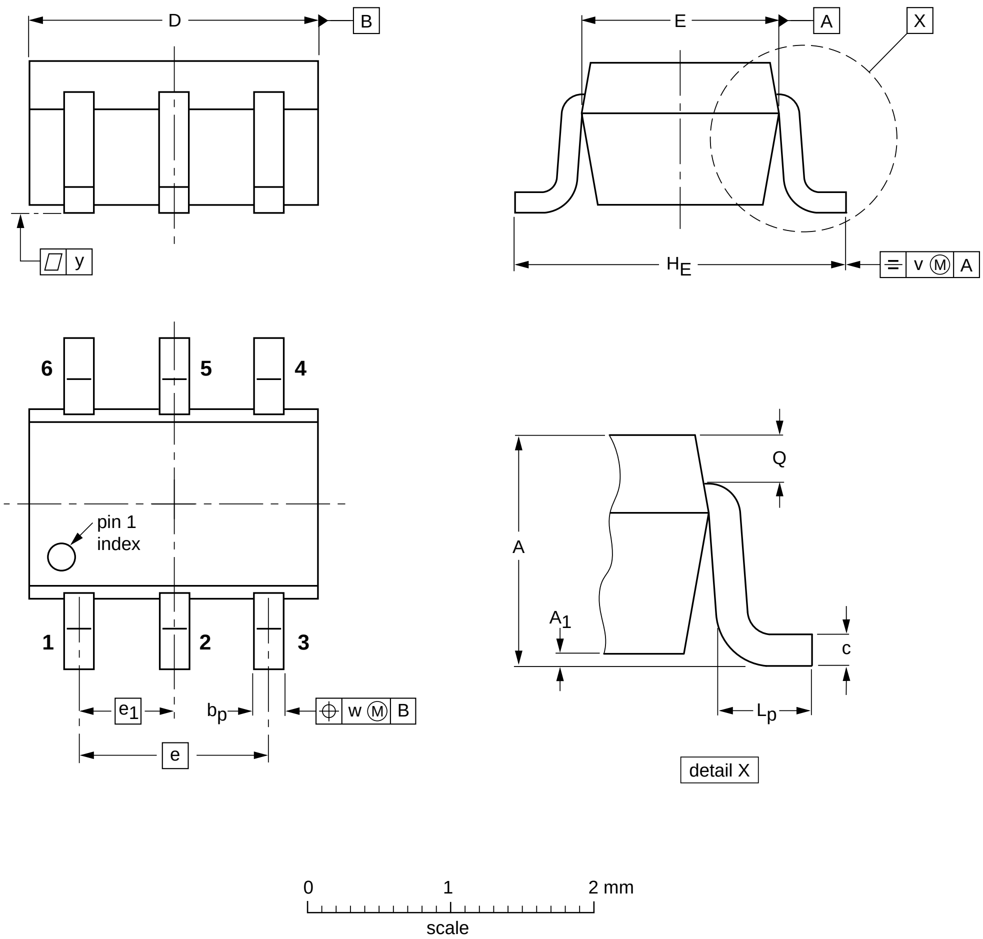
**Table 10. Test data**

| 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 × $V_{CC}$ |

[1] For measuring enable and disable times $R_L$ = 5 kΩ, for measuring propagation delays, setup and hold times and pulse width $R_L$ = 1 MΩ.

## 13. Package outline

**Plastic surface-mounted package; 6 leads** **SOT363**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w | y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.8 | 0.1 | 0.30<br>0.20 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.25<br>0.15 | 0.2 | 0.2 | 0.1 |

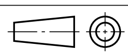
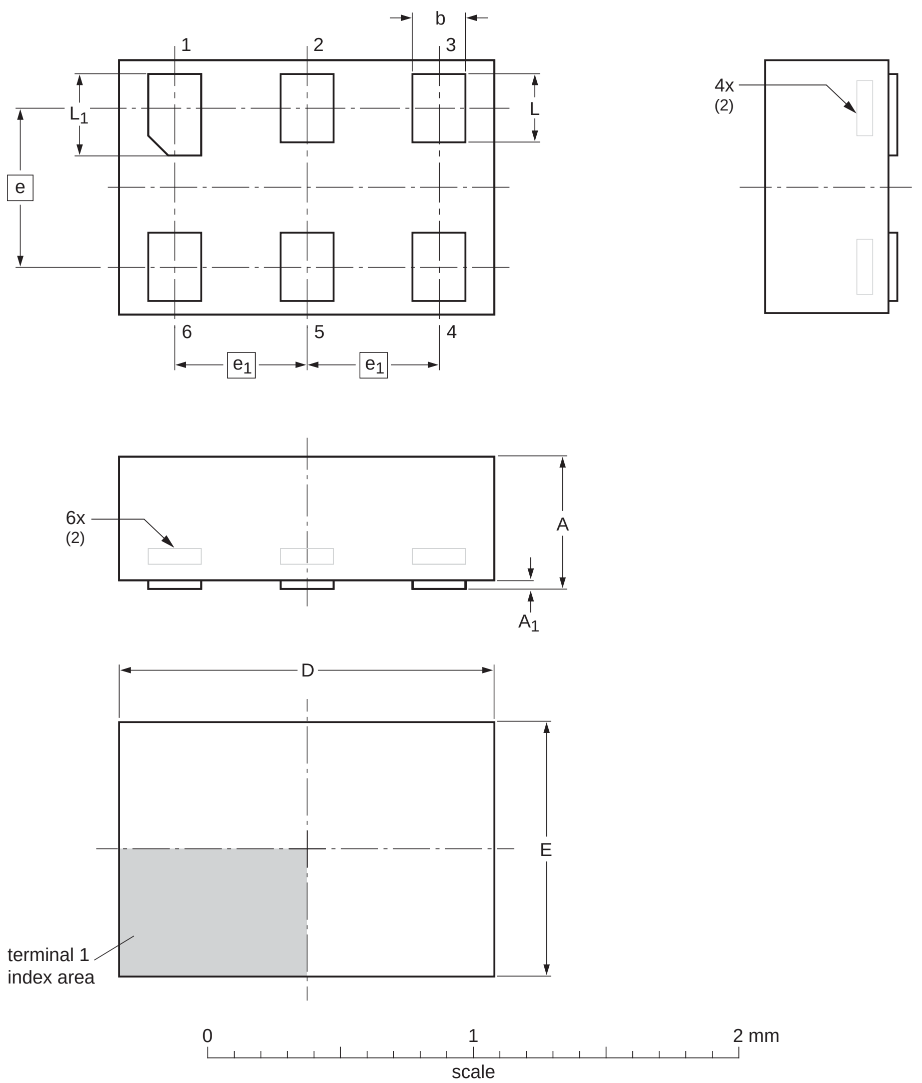
| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT363 | | | SC-88 | |  | ~~04-11-08~~<br>06-03-16 |

**Fig 9. 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 |
| | 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 |

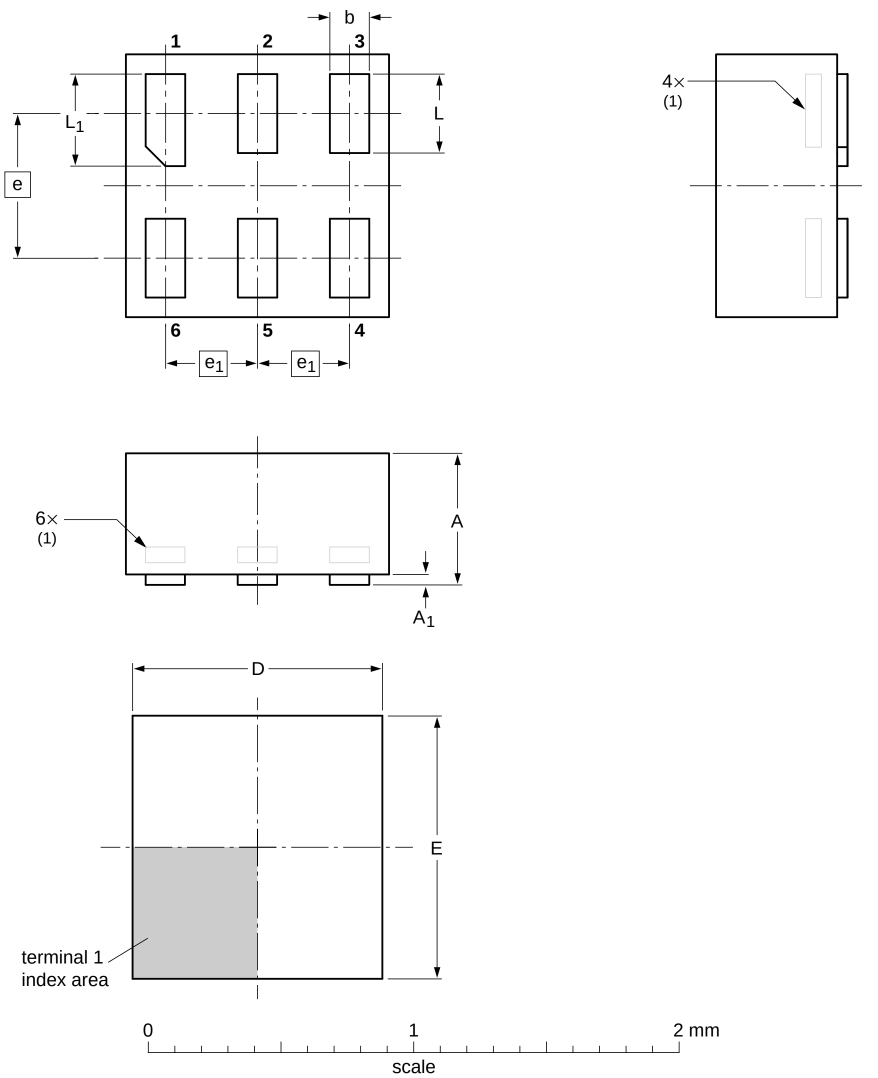
Notes
1. Including plating thickness.
2. Can be visible in some manufacturing processes.

*sot886_po*

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

**Fig 10. 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<br>0.12 | 1.05<br>0.95 | 1.05<br>0.95 | 0.55 | 0.35 | 0.35<br>0.27 | 0.40<br>0.32 |

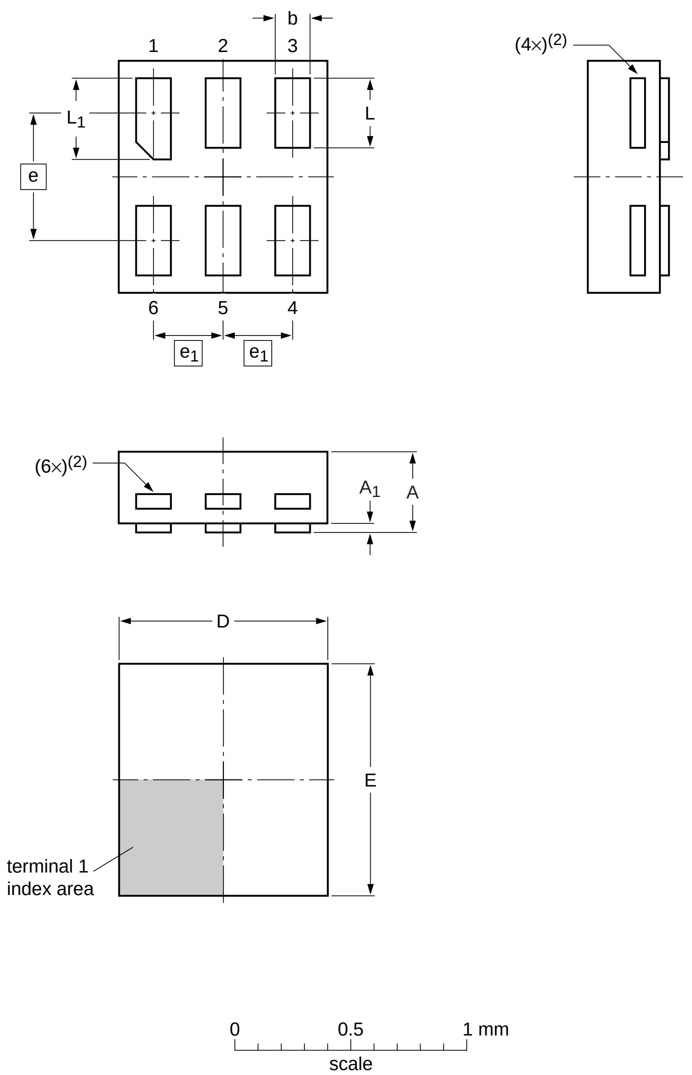
**Note**

1. Can be visible in some manufacturing processes.

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

**Fig 11. 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
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

*sot1115_po*

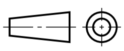
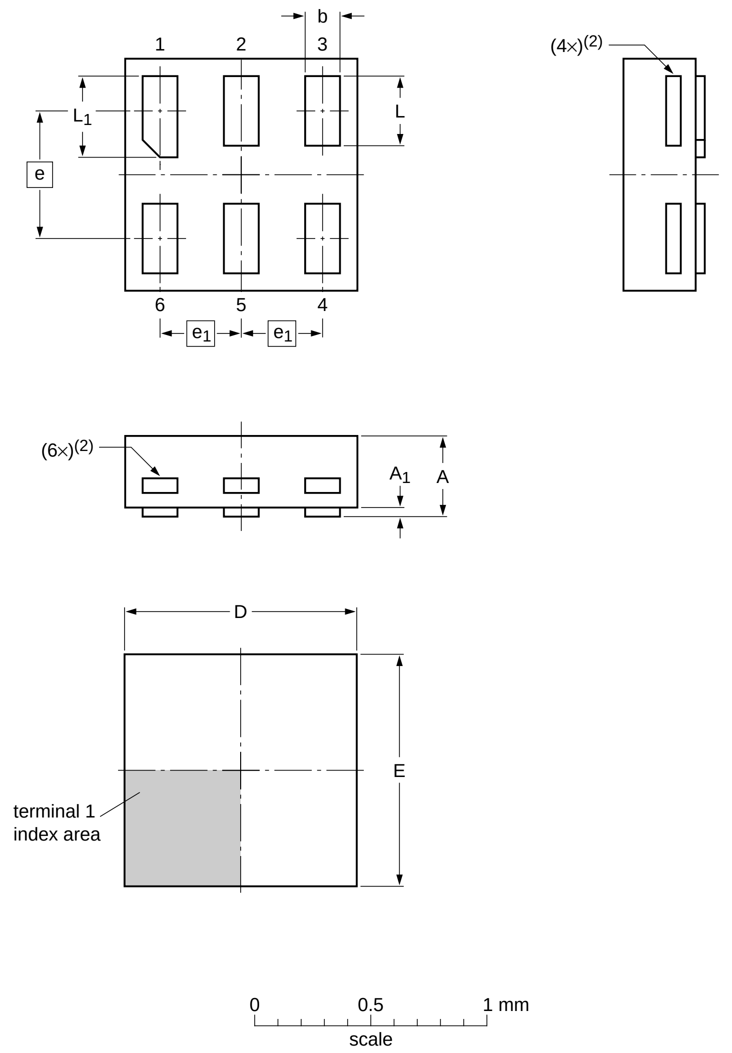
| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1115 | | | | |  | ~~10-04-02~~<br>10-04-07 |

**Fig 12. 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 | $L_1$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | max | 0.35 | 0.04 | 0.20 | 1.05 | 1.05 | | | 0.35 | 0.40 |
| mm | 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
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

*sot1202_po*

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

**Fig 13. Package outline SOT1202 (XSON6)**

## 14. Abbreviations

**Table 11. Abbreviations**

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

## 15. Revision history

**Table 12. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| 74AUP1G332 v.5 | 20120704 | Product data sheet | - | 74AUP1G332 v.4 |
| Modifications: | • Package outline drawing of SOT886 (Figure 10) modified. | | | |
| 74AUP1G332 v.4 | 20111125 | Product data sheet | - | 74AUP1G332 v.3 |
| Modifications: | • Legal pages updated. | | | |
| 74AUP1G332 v.3 | 20101007 | Product data sheet | - | 74AUP1G332 v.2 |
| 74AUP1G332 v.2 | 20080229 | Product data sheet | - | 74AUP1G332 v.1 |
| 74AUP1G332 v.1 | 20061113 | Product data sheet | - | - |

# 16. Legal information

## 16.1 Data sheet status

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

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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