# 74AUP1G125-Q100

## Low-power buffer/line driver; 3-state

Rev. 4 — 14 January 2022 Product data sheet

## 1. General description

The 74AUP1G125-Q100 is a single buffer/line driver with 3-state output. Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times. 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.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

## 2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- 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:
  - MIL-STD-883, method 3015 Class 3A. Exceeds 5000 V
  - HBM JESD22-A114F Class 3A. Exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V (C = 200 pF, R = 0 Ω)
- 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 $V_{CC}$
- Input-disable feature allows floating input conditions
- $I_{OFF}$ circuitry provides partial Power-down mode operation

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## 3. Ordering information

**Table 1. Ordering information**

| Type number | Package | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| 74AUP1G125GW-Q100 | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm | SOT353-1 |
| 74AUP1G125GM-Q100 | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm | SOT886 |
| 74AUP1G125GS-Q100 | -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] |
|---|---|
| 74AUP1G125GW-Q100 | pM |
| 74AUP1G125GM-Q100 | pM |
| 74AUP1G125GS-Q100 | pM |

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

## 5. Functional diagram

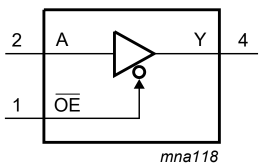



**Fig. 1. Logic symbol**

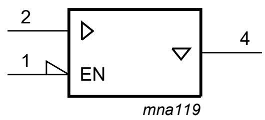



**Fig. 2. IEC logic symbol**

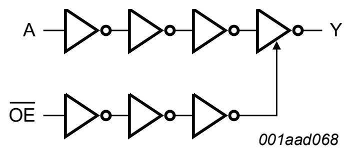



**Fig. 3. Logic diagram**

## 6. Pinning information

### 6.1. Pinning

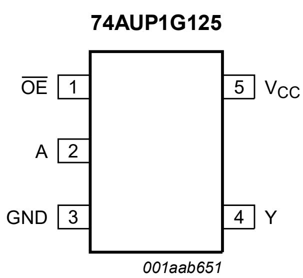
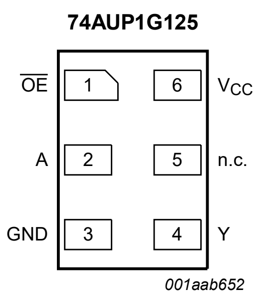
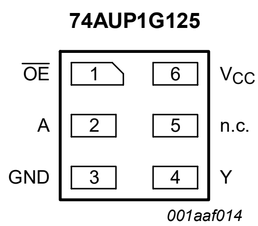



**Fig. 4. Pin configuration SOT353-1 (TSSOP5)**




Transparent top view

**Fig. 5. Pin configuration SOT886 (XSON6)**




Transparent top view

**Fig. 6. Pin configuration SOT1202 (XSON6)**

### 6.2. Pin description

**Table 3. Pin description**

| Symbol | Pin | | Description |
|---|---|---|---|
| | TSSOP5 | XSON6 | |
| $\overline{OE}$ | 1 | 1 | output enable 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; X = Don't care; Z = high-impedance OFF-state.*

| Input | | Output |
|---|---|---|
| $\overline{OE}$ | A | Y |
| L | L | L |
| L | H | H |
| H | X | Z |

## 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 [1] | -0.5 | $V_{CC}$ + 0.5 | V |
| | | Power-down mode; $V_{CC}$ = 0 V [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 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 SOT886 (XSON6) package: $P_{tot}$ derates linearly with 3.3 mW/K above 74 °C.
For SOT1202 (XSON6) package: $P_{tot}$ derates linearly with 3.3 mW/K above 74 °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 |
| 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 |

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_I$ | input leakage current | $V_I$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V | | - | - | ±0.1 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_O$ = 0 V 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 | data input; $V_I = V_{CC}$ - 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 40 | μA |
| | | $\overline{OE}$ input; $V_I = V_{CC}$ - 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 110 | μA |
| | | all inputs; $V_I$ = GND to 3.6 V; $\overline{OE} = V_{CC}$; $V_{CC}$ = 0.8 V to 3.6 V | [2] | - | - | 1 | μA |
| $C_I$ | input capacitance | $V_{CC}$ = 0 V to 3.6 V; $V_I$ = GND or $V_{CC}$ | | - | 0.9 | - | pF |
| $C_O$ | output capacitance | output enabled; $V_O$ = GND; $V_{CC}$ = 0 V | | - | 1.7 | - | pF |
| | | output disabled; $V_{CC}$ = 0 V to 3.6 V; $V_O$ = GND or $V_{CC}$ | | - | 1.5 | - | pF |
| **$T_{amb}$ = -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 |

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_I$ | input leakage current | $V_I$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V | | - | - | ±0.5 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_O$ = 0 V 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 | data input; $V_I$ = $V_{CC}$ - 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 50 | μA |
| | | $\overline{OE}$ input; $V_I$ = $V_{CC}$ - 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 120 | μA |
| | | all inputs; $V_I$ = GND to 3.6 V; $\overline{OE}$ = $V_{CC}$; $V_{CC}$ = 0.8 V to 3.6 V | [2] | - | - | 1 | 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 |
| $V_{OH}$ | 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 |

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_I$ | input leakage current | $V_I$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V | | - | - | ±0.75 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_O$ = 0 V 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 | data input; $V_I$ = $V_{CC}$ - 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 75 | μA |
| | | $\overline{OE}$ input; $V_I$ = $V_{CC}$ - 0.6 V; $I_O$ = 0 A; $V_{CC}$ = 3.3 V | [1] | - | - | 180 | μA |
| | | all inputs; $V_I$ = GND to 3.6 V; $\overline{OE}$ = $V_{CC}$; $V_{CC}$ = 0.8 V to 3.6 V | [2] | - | - | 1 | μA |

[1] One input at $V_{CC}$ - 0.6 V, other input at $V_{CC}$ or GND.
[2] To show $I_{CC}$ remains very low when the input-disable feature is enabled.

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

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

| Symbol | Parameter | Conditions | | $T_{amb}$ = 25 °C | | | $T_{amb}$ = -40 °C to +85 °C | | $T_{amb}$ = -40 °C to +125 °C | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ [1] | Max | Min | Max | Min | Max | |
| **$C_L$ = 5 pF** | | | | | | | | | | | |
| $t_{pd}$ | propagation delay | A to Y; see Fig. 7 | [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 20.6 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 2.8 | 5.5 | 10.5 | 2.5 | 11.7 | 2.5 | 12.9 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 2.2 | 3.9 | 6.1 | 2.0 | 7.3 | 2.0 | 8.1 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 1.9 | 3.2 | 4.8 | 1.7 | 6.1 | 1.7 | 6.7 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 1.6 | 2.6 | 3.6 | 1.4 | 4.3 | 1.4 | 4.9 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 1.4 | 2.4 | 3.1 | 1.2 | 3.9 | 1.2 | 4.4 | ns |
| $t_{en}$ | enable time | $\overline{OE}$ to Y; see Fig. 8 | [3] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 69.9 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 3.1 | 6.1 | 11.8 | 2.9 | 13.9 | 2.9 | 15.4 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 2.5 | 4.2 | 6.6 | 2.3 | 7.7 | 2.3 | 8.3 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 2.1 | 3.4 | 5.1 | 2.0 | 6.2 | 2.0 | 6.8 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 1.8 | 2.6 | 3.7 | 1.7 | 4.5 | 1.7 | 5.0 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 1.7 | 2.4 | 3.1 | 1.7 | 3.5 | 1.7 | 3.9 | ns |

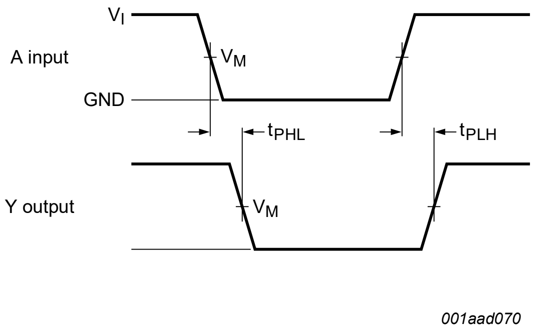
| Symbol | Parameter | Conditions | | $T_{amb}$ = 25 °C | | | $T_{amb}$ = -40 °C to +85 °C | | $T_{amb}$ = -40 °C to +125 °C | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ [1] | Max | Min | Max | Min | Max | |
| $t_{dis}$ | disable time | $\overline{OE}$ to Y; see Fig. 8 | [4] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 14.3 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 2.7 | 4.3 | 6.5 | 2.7 | 7.3 | 2.7 | 8.2 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 2.1 | 3.2 | 4.4 | 2.1 | 5.1 | 2.1 | 5.7 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 2.0 | 3.0 | 4.3 | 2.0 | 5.0 | 2.0 | 5.7 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 1.4 | 2.2 | 2.9 | 1.4 | 3.3 | 1.4 | 4.1 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 1.7 | 2.5 | 3.2 | 1.7 | 3.4 | 1.7 | 3.9 | ns |
| **$C_L$ = 10 pF** | | | | | | | | | | | |
| $t_{pd}$ | propagation delay | A to Y; see Fig. 7 | [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 24.0 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 3.2 | 6.4 | 12.3 | 3.0 | 13.8 | 3.0 | 15.2 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 2.1 | 4.5 | 7.3 | 1.9 | 8.5 | 1.9 | 9.4 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 1.9 | 3.8 | 5.5 | 1.7 | 6.8 | 1.7 | 7.6 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 2.1 | 3.2 | 4.2 | 1.6 | 5.3 | 1.6 | 5.9 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 1.8 | 3.0 | 3.8 | 1.6 | 4.6 | 1.6 | 5.2 | ns |
| $t_{en}$ | enable time | $\overline{OE}$ to Y; see Fig. 8 | [3] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 73.7 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 3.6 | 6.9 | 13.5 | 3.4 | 15.8 | 3.4 | 17.5 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 2.3 | 4.8 | 7.7 | 2.2 | 8.6 | 2.2 | 9.4 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 2.0 | 3.9 | 5.8 | 1.9 | 6.8 | 1.9 | 7.4 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 1.8 | 3.2 | 4.3 | 1.7 | 5.3 | 1.7 | 5.9 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 1.7 | 3.0 | 3.9 | 1.7 | 4.3 | 1.7 | 4.8 | ns |
| $t_{dis}$ | disable time | $\overline{OE}$ to Y; see Fig. 8 | [4] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 32.7 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 3.4 | 5.4 | 7.9 | 3.4 | 8.8 | 3.4 | 9.9 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 2.2 | 4.1 | 5.5 | 2.2 | 6.2 | 2.2 | 7.1 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 2.2 | 4.2 | 5.6 | 1.9 | 6.3 | 1.9 | 7.1 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 1.7 | 3.0 | 3.8 | 1.7 | 4.5 | 1.7 | 5.1 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 2.1 | 3.8 | 4.8 | 1.7 | 5.0 | 1.7 | 5.6 | ns |
| **$C_L$ = 15 pF** | | | | | | | | | | | |
| $t_{pd}$ | propagation delay | A to Y; see Fig. 7 | [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 27.4 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 3.6 | 7.2 | 14.1 | 3.3 | 15.8 | 3.3 | 17.5 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 3.0 | 5.1 | 8.1 | 2.5 | 9.8 | 2.5 | 10.9 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 2.2 | 4.3 | 6.3 | 2.0 | 7.9 | 2.0 | 8.8 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 2.0 | 3.7 | 4.9 | 1.8 | 6.0 | 1.8 | 6.7 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 2.0 | 3.5 | 4.4 | 1.8 | 5.4 | 1.8 | 6.1 | ns |

| Symbol | Parameter | Conditions | $T_{amb}$ = 25 °C | | | $T_{amb}$ = -40 °C to +85 °C | | $T_{amb}$ = -40 °C to +125 °C | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ [1] | Max | Min | Max | Min | Max | |
| $t_{en}$ | enable time | $\overline{OE}$ to Y; see Fig. 8 [3] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 77.5 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 4.0 | 7.7 | 15.2 | 3.7 | 17.6 | 3.7 | 19.6 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 3.0 | 5.3 | 8.4 | 2.5 | 9.8 | 2.5 | 10.7 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.3 | 4.4 | 6.5 | 2.1 | 7.7 | 2.1 | 8.5 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.1 | 3.6 | 5.0 | 2.0 | 6.1 | 2.0 | 6.8 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 2.0 | 3.5 | 4.5 | 1.9 | 4.9 | 1.9 | 5.5 | ns |
| $t_{dis}$ | disable time | $\overline{OE}$ to Y; see Fig. 8 [4] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 60.8 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 4.3 | 6.5 | 9.2 | 3.7 | 10.3 | 3.7 | 11.6 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 3.0 | 5.0 | 6.5 | 2.5 | 7.4 | 2.5 | 8.4 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 3.0 | 5.3 | 6.6 | 2.1 | 7.4 | 2.1 | 8.9 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.1 | 3.8 | 4.9 | 2.0 | 5.1 | 2.0 | 6.4 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 2.9 | 5.0 | 6.2 | 1.9 | 6.6 | 1.9 | 7.4 | ns |
| **$C_L$ = 30 pF** | | | | | | | | | | |
| $t_{pd}$ | propagation delay | A to Y; see Fig. 7 [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 37.4 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 4.8 | 9.5 | 19.0 | 4.4 | 21.6 | 4.4 | 24.0 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 4.0 | 6.7 | 10.8 | 3.0 | 13.0 | 3.0 | 14.5 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.9 | 5.6 | 8.4 | 2.6 | 10.3 | 2.6 | 11.5 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.7 | 4.8 | 6.3 | 2.5 | 7.8 | 2.5 | 8.7 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 2.7 | 4.6 | 5.8 | 2.5 | 7.5 | 2.5 | 8.3 | ns |
| $t_{en}$ | enable time | $\overline{OE}$ to Y; see Fig. 8 [3] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 88.9 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 5.2 | 9.9 | 19.8 | 4.8 | 22.8 | 4.8 | 25.3 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 4.0 | 6.8 | 10.8 | 3.1 | 12.6 | 3.1 | 14.1 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 3.0 | 5.6 | 8.5 | 2.8 | 10.2 | 2.8 | 11.3 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.7 | 4.8 | 6.5 | 2.6 | 7.8 | 2.6 | 8.8 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 2.7 | 4.6 | 6.0 | 2.6 | 6.9 | 2.6 | 7.7 | ns |
| $t_{dis}$ | disable time | $\overline{OE}$ to Y; see Fig. 8 [4] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 49.9 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 6.0 | 9.9 | 13.3 | 4.8 | 14.8 | 4.8 | 16.5 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 4.4 | 7.7 | 9.6 | 3.1 | 10.7 | 3.1 | 12.1 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 5.1 | 8.7 | 11.1 | 2.8 | 12.4 | 2.8 | 13.8 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 3.6 | 6.2 | 7.4 | 2.6 | 8.6 | 2.6 | 9.6 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 5.2 | 8.7 | 10.5 | 2.6 | 10.8 | 2.6 | 13.1 | ns |

| Symbol | Parameter | Conditions | $T_{amb}$ = 25 °C | | | $T_{amb}$ = -40 °C to +85 °C | | $T_{amb}$ = -40 °C to +125 °C | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ [1] | Max | Min | Max | Min | Max | |
| $T_{amb}$ = 25 °C | | | | | | | | | | |
| $C_{PD}$ | power dissipation capacitance | f = 1 MHz; $V_I$ = GND to $V_{CC}$; output enabled [5] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 2.7 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 1.1 V to 1.3 V | - | 2.8 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 1.4 V to 1.6 V | - | 2.9 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 1.65 V to 1.95 V | - | 3.0 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 2.3 V to 2.7 V | - | 3.6 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 3.0 V to 3.6 V | - | 4.2 | - | - | - | - | - | pF |

[1] All typical values are measured at nominal $V_{CC}$.
[2] $t_{pd}$ is the same as $t_{PLH}$ and $t_{PHL}$.
[3] $t_{en}$ is the same as $t_{PZH}$ and $t_{PZL}$.
[4] $t_{dis}$ is the same as $t_{PHZ}$ and $t_{PLZ}$.
[5] $C_{PD}$ 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.

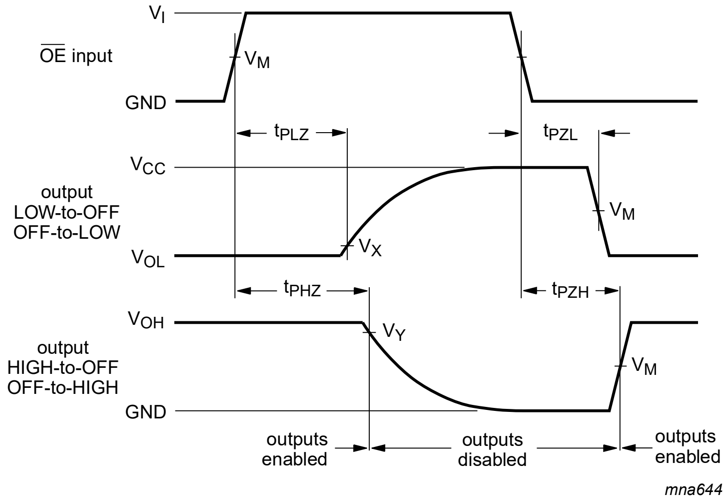
## 11.1. Waveforms and test circuit




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. 7. The data input (A) to output (Y) propagation delays**



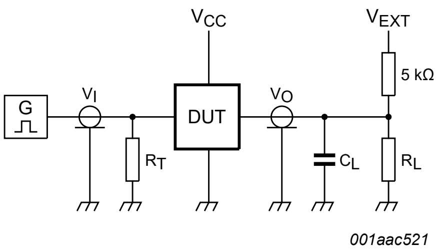

Measurement points are given in Table 9.

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

**Fig. 8. Enable and disable times**

**Table 9. Measurement points**

| Supply voltage | Input | | | Output | | |
|---|---|---|---|---|---|---|
| $V_{CC}$ | $V_M$ | $V_I$ | $t_r = t_f$ | $V_M$ | $V_X$ | $V_Y$ |
| 0.8 V to 1.6 V | 0.5 × $V_{CC}$ | $V_{CC}$ | ≤ 3.0 ns | 0.5 × $V_{CC}$ | $V_{OL}$ + 0.1 V | $V_{OH}$ - 0.1 V |
| 1.65 V to 2.7 V | 0.5 × $V_{CC}$ | $V_{CC}$ | ≤ 3.0 ns | 0.5 × $V_{CC}$ | $V_{OL}$ + 0.15 V | $V_{OH}$ - 0.15 V |
| 3.0 V to 3.6 V | 0.5 × $V_{CC}$ | $V_{CC}$ | ≤ 3.0 ns | 0.5 × $V_{CC}$ | $V_{OL}$ + 0.3 V | $V_{OH}$ - 0.3 V |




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**

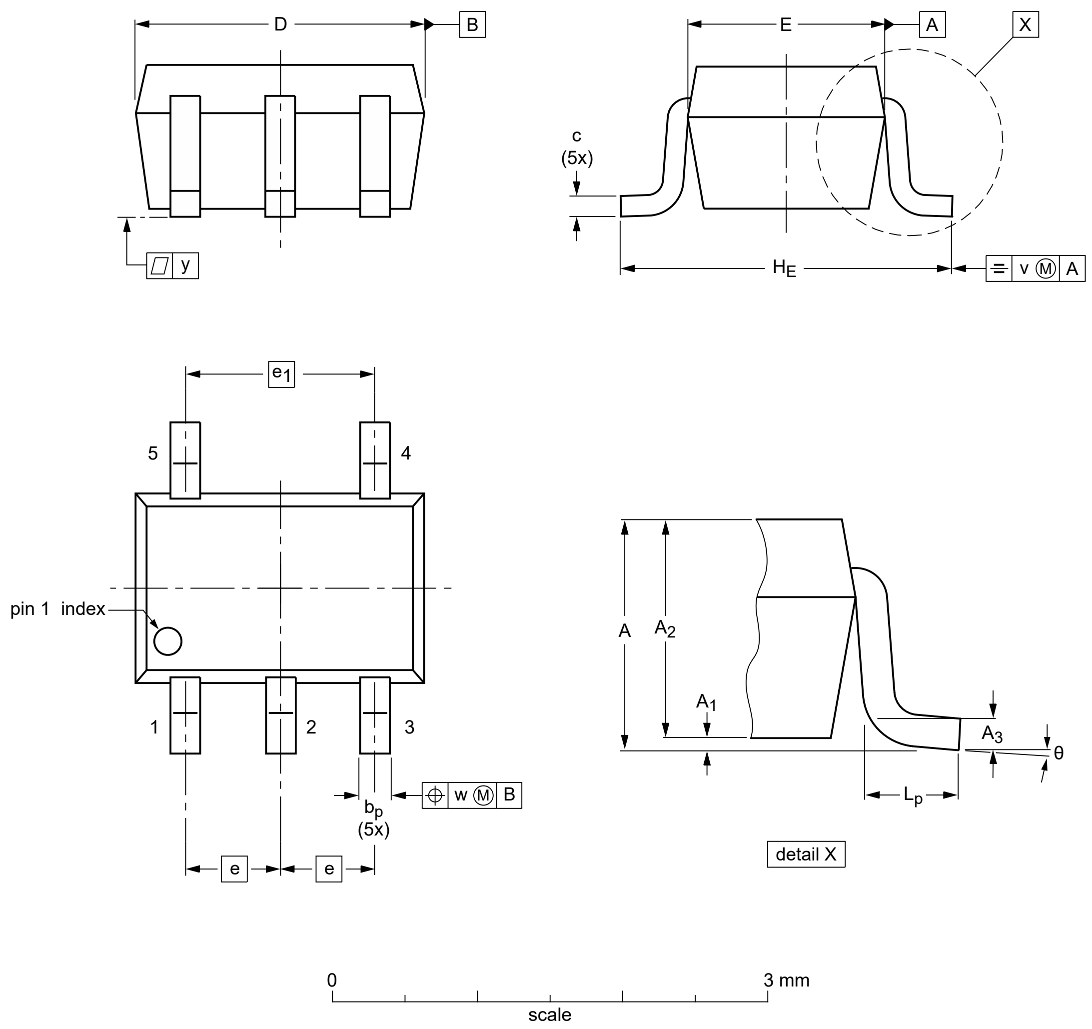
**Table 10. Test data**

| 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 × $V_{CC}$ |

[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.

## 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 | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | D(1) | E(1) | e | $e_1$ | $H_E$ | $L_p$ | v | w | y | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 1.1 | 0.1 | 1.0 | 0.15 | 0.30 | 0.25 | 2.2 | 1.35 | 0.65 | 1.3 | 2.4 | 0.46 | 0.3 | 0.1 | 0.1 | 8° |
| | min | 0.8 | 0 | 0.8 | | 0.15 | 0.08 | 1.8 | 1.15 | | | 1.8 | 0.26 | | | | 0° |

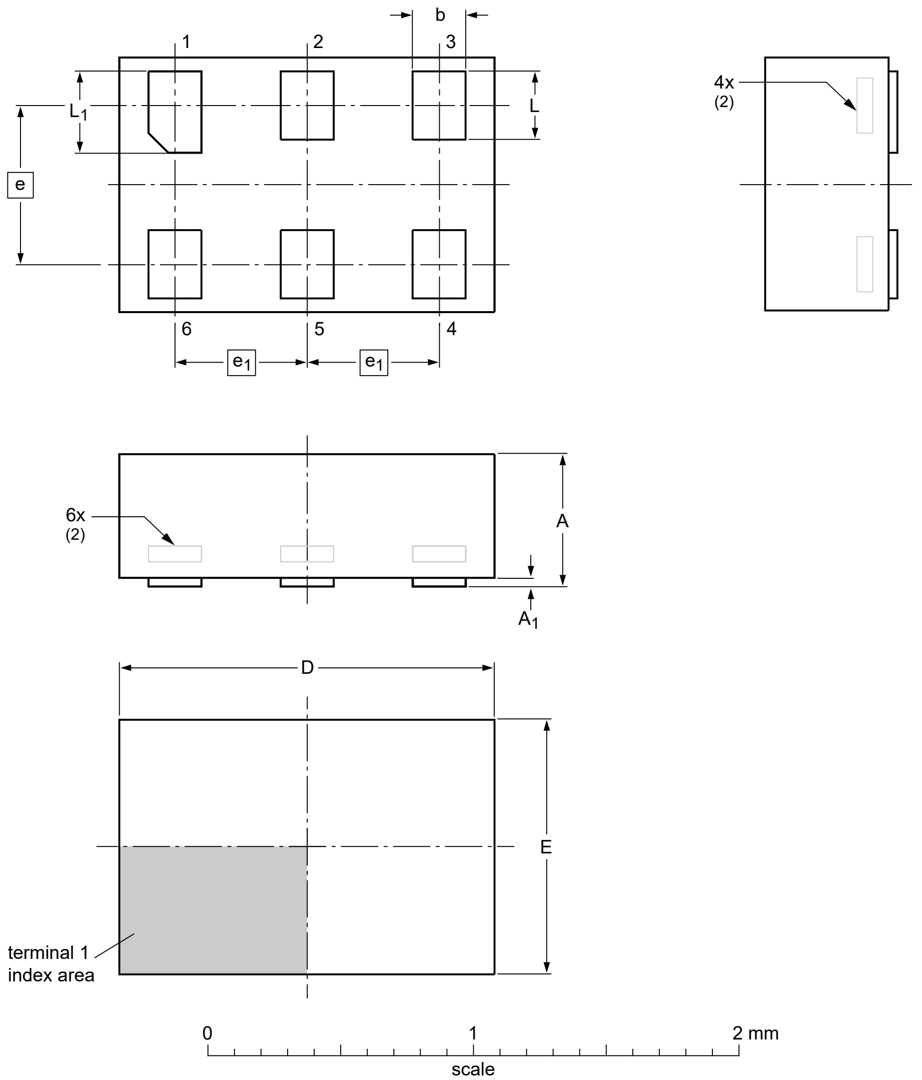
Note
1. Plastic or metal protrusions of 0.2 mm maximum per side are not included.

*sot353-1_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT353-1 | | MO-203 | SC-88A | | | ~~21-12-15~~<br>21-12-16 |

**Fig. 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 |
| mm | 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 |

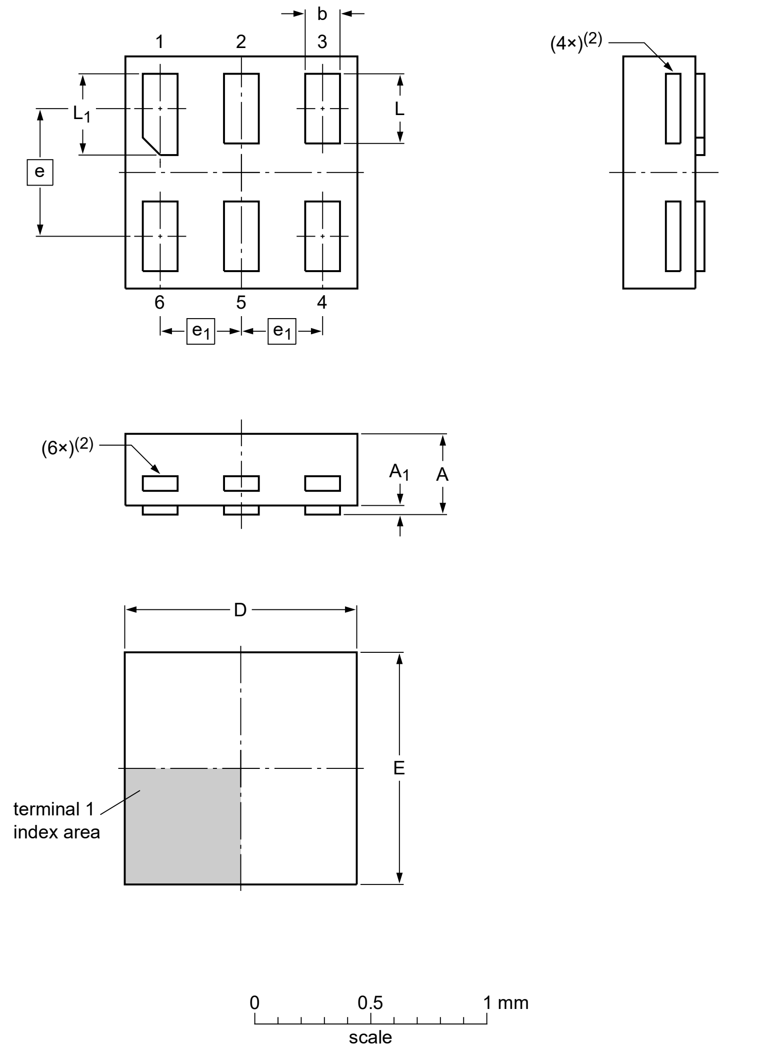
Notes
1. Including plating thickness.
2. Can be visible in some manufacturing processes.

*sot886_po*

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

**Fig. 11. Package outline SOT886 (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
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~~ 10-04-06 |

**Fig. 12. Package outline SOT1202 (XSON6)**

## 13. Abbreviations

**Table 11. Abbreviations**

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

## 14. Revision history

**Table 12. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| 74AUP1G125_Q100 v.4 | 20220114 | Product data sheet | - | 74AUP1G125_Q100 v.3 |
| Modifications: | • Fig. 10: Package outline drawing for SOT353-1 (TSSOP5) has changed. | | | |
| 74AUP1G125_Q100 v.3 | 20210421 | Product data sheet | - | 74AUP1G125_Q100 v.2 |
| Modifications: | • Section 1 updated.<br>• Table 5: Derating values for $P_{tot}$ total power dissipation updated. | | | |
| 74AUP1G125_Q100 v.2 | 20190125 | Product data sheet | - | 74AUP1G125_Q100 v.1 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• Type numbers 74AUP1G125GM-Q100 (SOT886) and 74AUP1G125GS-Q100 (SOT1202) added. | | | |
| 74AUP1G125_Q100 v.1 | 20130320 | 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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