

# 74AUP1G125-Q100

Low-power buffer/line driver; 3-state

Rev. 3 — 21 April 2021

Product data sheet

## 1. General description

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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

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- 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;  $I_{CC} = 0.9 \mu\text{A}$  (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  $V_{CC}$
- Input-disable feature allows floating input conditions
- $I_{OFF}$  circuitry provides partial Power-down mode operation

### 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
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

*mna118*

**Fig. 1. Logic symbol**

*mna119*

**Fig. 2. IEC logic symbol**

*001aad068*

**Fig. 3. Logic diagram**

### 6. Pinning information

#### 6.1. Pinning

*001aab651*

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

*001aab652*

Transparent top view

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

*001aaf014*

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 $V_{CC}$	-	$\pm 20$	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
$\Delta t/\Delta V$	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
<b><math>T_{amb} = 25</math> °C</b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8$ V	$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9$ V to 1.95 V	$0.65 \times V_{CC}$	-	-	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	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 0.9$ V to 1.95 V	-	-	$0.35 \times V_{CC}$	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 $V_{IL}$				
		$I_O = -20$ $\mu$ A; $V_{CC} = 0.8$ V to 3.6 V	$V_{CC} - 0.1$	-	-	V
		$I_O = -1.1$ mA; $V_{CC} = 1.1$ V	$0.75 \times V_{CC}$	-	-	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 $V_{IL}$				
		$I_O = 20$ $\mu$ A; $V_{CC} = 0.8$ V to 3.6 V	-	-	0.1	V
		$I_O = 1.1$ mA; $V_{CC} = 1.1$ V	-	-	$0.3 \times V_{CC}$	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	$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.1$	$\mu\text{A}$
$I_{OZ}$	OFF-state output current	$V_I = V_{IH} \text{ or } V_{IL}; V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.1$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.5	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	data input; $V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	40	$\mu\text{A}$
		$\overline{\text{OE}}$ input; $V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	110	$\mu\text{A}$
		all inputs; $V_I = \text{GND to } 3.6 \text{ V}; \overline{\text{OE}} = V_{CC}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ [2]	-	-	1	$\mu\text{A}$
$C_I$	input capacitance	$V_{CC} = 0 \text{ V to } 3.6 \text{ V}; V_I = \text{GND or } V_{CC}$	-	0.9	-	pF
$C_O$	output capacitance	output enabled; $V_O = \text{GND}; V_{CC} = 0 \text{ V}$	-	1.7	-	pF
		output disabled; $V_{CC} = 0 \text{ V to } 3.6 \text{ V}; V_O = \text{GND or } V_{CC}$	-	1.5	-	pF
<b><math>T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}</math></b>						
$V_{IH}$	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
$V_{OL}$	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	

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$I_{OZ}$	OFF-state output current	$V_I = V_{IH} \text{ or } V_{IL}; V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.6$	$\mu\text{A}$
$I_{CC}$	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	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	data input; $V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	50	$\mu\text{A}$
		$\overline{\text{OE}}$ input; $V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	120	$\mu\text{A}$
		all inputs; $V_I = \text{GND to } 3.6 \text{ V}; \overline{\text{OE}} = V_{CC}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ [2]	-	-	1	$\mu\text{A}$
<b><math>T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +125 \text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8 \text{ V}$	$0.75 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	$0.70 \times V_{CC}$	-	-	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	$V_{CC} = 0.8 \text{ V}$	-	-	$0.25 \times V_{CC}$	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	-	-	$0.30 \times V_{CC}$	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	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = -20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	$V_{CC} - 0.11$	-	-	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	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = 20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	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	

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
$I_{OZ}$	OFF-state output current	$V_I = V_{IH} \text{ or } V_{IL}; V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
$I_{CC}$	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	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	data input; $V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	75	$\mu\text{A}$
		$\overline{\text{OE}}$ input; $V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	180	$\mu\text{A}$
		all inputs; $V_I = \text{GND to } 3.6 \text{ V}; \overline{\text{OE}} = V_{CC}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ [2]	-	-	1	$\mu\text{A}$

- [1] One input at  $V_{CC} - 0.6 \text{ V}$ , 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	$T_{\text{amb}} = 25 \text{ }^\circ\text{C}$			$T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}$		$T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +125 \text{ }^\circ\text{C}$		Unit
			Min	Typ [1]	Max	Min	Max	Min	Max	
<b><math>C_L = 5 \text{ pF}</math></b>										
$t_{\text{pd}}$	propagation delay	A to Y; see Fig. 7 [2]								
		$V_{CC} = 0.8 \text{ V}$	-	20.6	-	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	2.8	5.5	10.5	2.5	11.7	2.5	12.9	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.2	3.9	6.1	2.0	7.3	2.0	8.1	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	1.9	3.2	4.8	1.7	6.1	1.7	6.7	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	2.6	3.6	1.4	4.3	1.4	4.9	ns
$t_{\text{en}}$	enable time	$\overline{\text{OE}}$ to Y; see Fig. 8 [3]								
		$V_{CC} = 0.8 \text{ V}$	-	69.9	-	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	3.1	6.1	11.8	2.9	13.9	2.9	15.4	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.5	4.2	6.6	2.3	7.7	2.3	8.3	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.1	3.4	5.1	2.0	6.2	2.0	6.8	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.8	2.6	3.7	1.7	4.5	1.7	5.0	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.7	2.4	3.1	1.7	3.5	1.7	3.9	ns

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

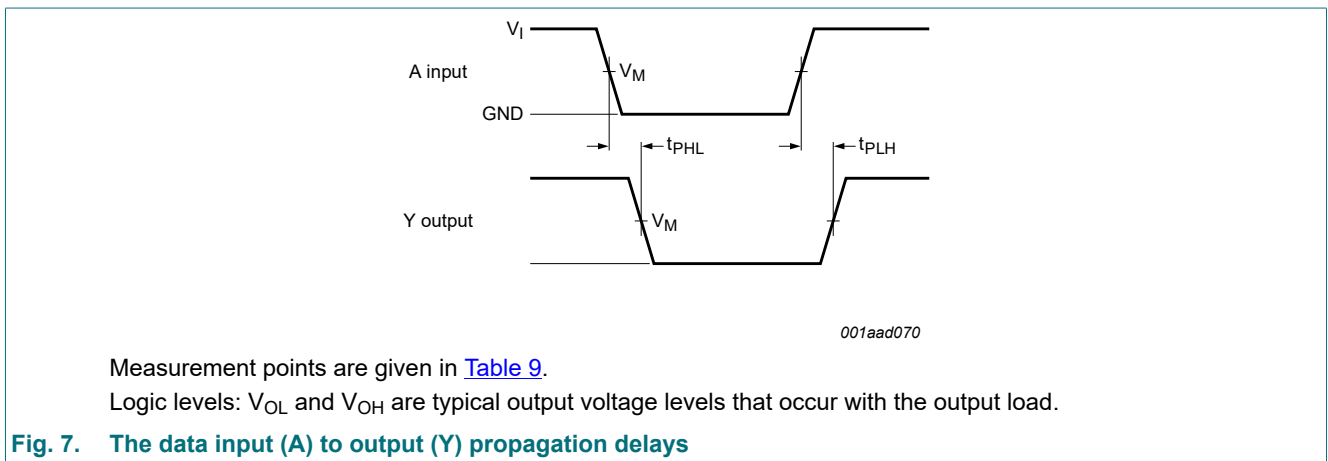


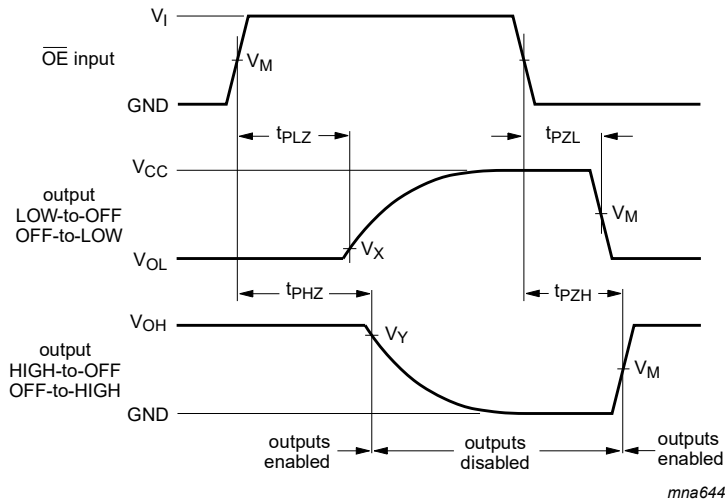
Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +85 °C		T <sub>amb</sub> = -40 °C to +125 °C		Unit
			Min	Typ [1]	Max	Min	Max	Min	Max	
t <sub>en</sub>	enable time	$\overline{OE}$ to Y; see Fig. 8 [3]								
		V <sub>CC</sub> = 0.8 V	-	77.5	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.0	7.7	15.2	3.7	17.6	3.7	19.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.3	8.4	2.5	9.8	2.5	10.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	4.4	6.5	2.1	7.7	2.1	8.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.6	5.0	2.0	6.1	2.0	6.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.5	4.5	1.9	4.9	1.9	5.5	ns
t <sub>dis</sub>	disable time	$\overline{OE}$ to Y; see Fig. 8 [4]								
		V <sub>CC</sub> = 0.8 V	-	60.8	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.3	6.5	9.2	3.7	10.3	3.7	11.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.0	6.5	2.5	7.4	2.5	8.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	5.3	6.6	2.1	7.4	2.1	8.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.8	4.9	2.0	5.1	2.0	6.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.9	5.0	6.2	1.9	6.6	1.9	7.4	ns
<b>C<sub>L</sub> = 30 pF</b>										
t <sub>pd</sub>	propagation delay	A to Y; see Fig. 7 [2]								
		V <sub>CC</sub> = 0.8 V	-	37.4	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.8	9.5	19.0	4.4	21.6	4.4	24.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	6.7	10.8	3.0	13.0	3.0	14.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.9	5.6	8.4	2.6	10.3	2.6	11.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.7	4.8	6.3	2.5	7.8	2.5	8.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	4.6	5.8	2.5	7.5	2.5	8.3	ns
t <sub>en</sub>	enable time	$\overline{OE}$ to Y; see Fig. 8 [3]								
		V <sub>CC</sub> = 0.8 V	-	88.9	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	5.2	9.9	19.8	4.8	22.8	4.8	25.3	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	6.8	10.8	3.1	12.6	3.1	14.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	5.6	8.5	2.8	10.2	2.8	11.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.7	4.8	6.5	2.6	7.8	2.6	8.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	4.6	6.0	2.6	6.9	2.6	7.7	ns
t <sub>dis</sub>	disable time	$\overline{OE}$ to Y; see Fig. 8 [4]								
		V <sub>CC</sub> = 0.8 V	-	49.9	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	6.0	9.9	13.3	4.8	14.8	4.8	16.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.4	7.7	9.6	3.1	10.7	3.1	12.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	5.1	8.7	11.1	2.8	12.4	2.8	13.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	3.6	6.2	7.4	2.6	8.6	2.6	9.6	ns
		V <sub>CC</sub> = 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 <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +85 °C		T <sub>amb</sub> = -40 °C to +125 °C		Unit
			Min	Typ [1]	Max	Min	Max	Min	Max	
T <sub>amb</sub> = 25 °C										
C <sub>PD</sub>	power dissipation capacitance	f = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> ; output enabled [5]								
		V <sub>CC</sub> = 0.8 V	-	2.7	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	2.8	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	2.9	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	3.0	-	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.6	-	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.2	-	-	-	-	-	pF

- [1] All typical values are measured at nominal V<sub>CC</sub>.
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.
- [3] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.
- [4] t<sub>dis</sub> is the same as t<sub>PHZ</sub> and t<sub>PLZ</sub>.
- [5] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> 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<sub>i</sub> = input frequency in MHz;  
 f<sub>o</sub> = output frequency in MHz;  
 C<sub>L</sub> = output load capacitance in pF;  
 V<sub>CC</sub> = supply voltage in V;  
 N = number of inputs switching;  
 Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of the outputs.

### 11.1. Waveforms and test circuit





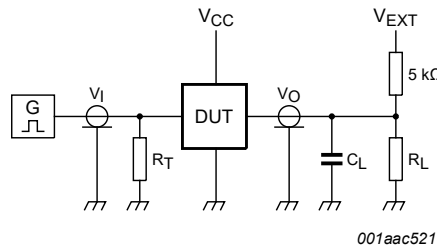
Measurement points are given in [Table 9](#).

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

**Fig. 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	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 3.0$ ns	$0.5 \times V_{CC}$	$V_{OL} + 0.1$ V	$V_{OH} - 0.1$ V
1.65 V to 2.7 V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 3.0$ ns	$0.5 \times V_{CC}$	$V_{OL} + 0.15$ V	$V_{OH} - 0.15$ V
3.0 V to 3.6 V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 3.0$ ns	$0.5 \times V_{CC}$	$V_{OL} + 0.3$ 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 $2 \times V_{CC}$

[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

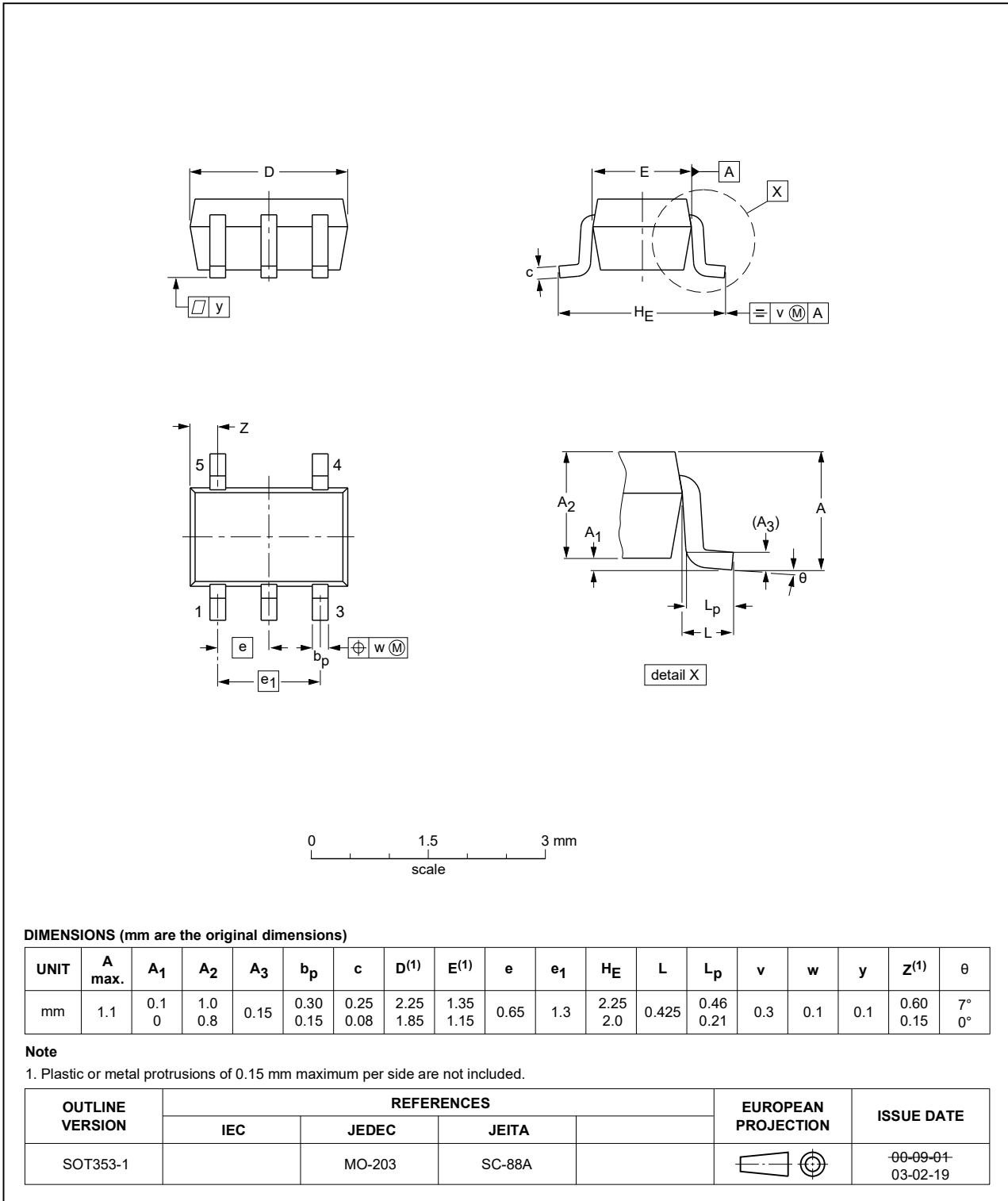


Fig. 10. Package outline SOT353-1 (TSSOP5)

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

SOT886

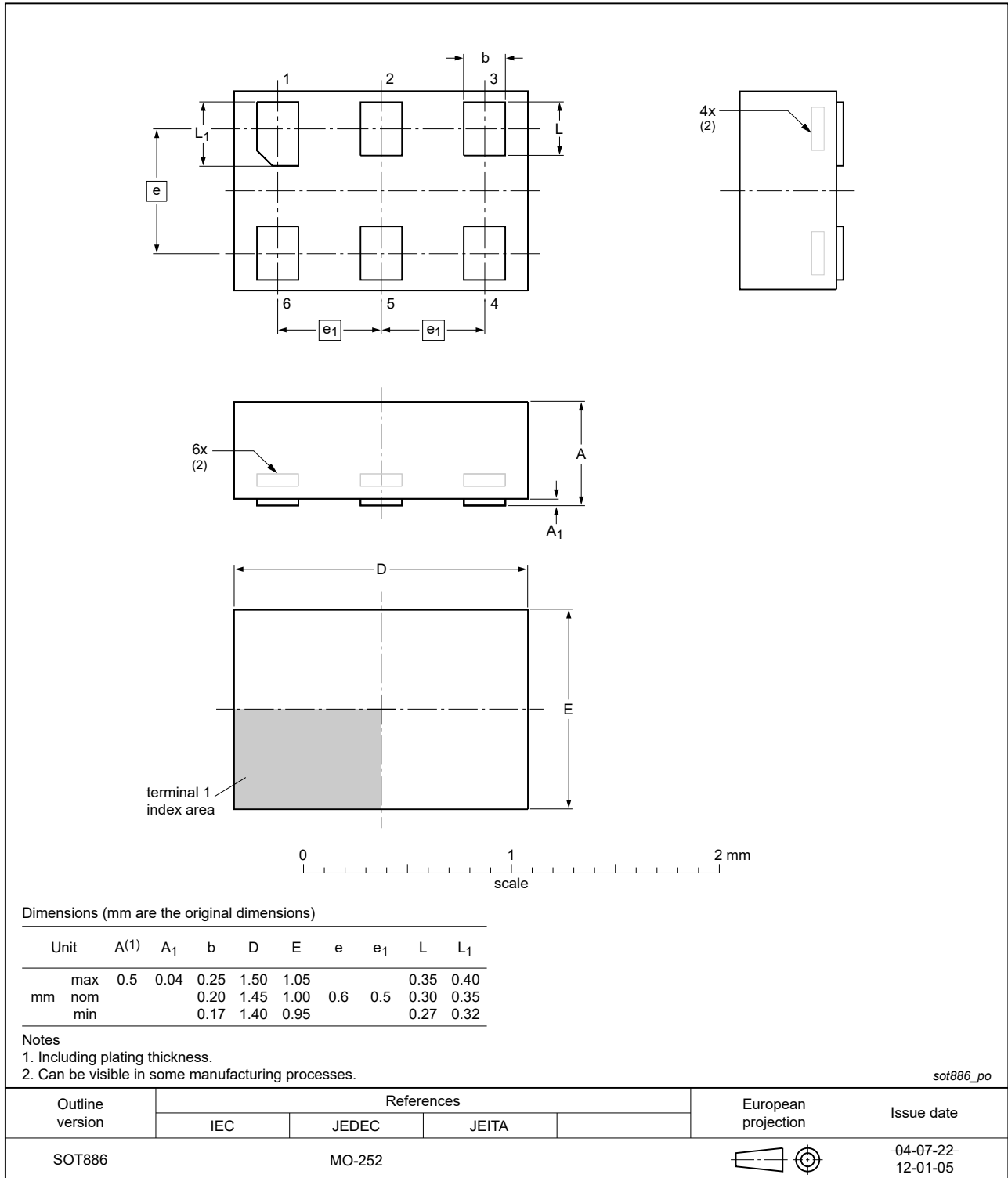


Fig. 11. Package outline SOT886 (XSON6)

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

SOT1202



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.3	20210421	Product data sheet	-	74AUP1G125_Q100 v.2
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Section 1</a> updated.</li> <li>• <a href="#">Table 5</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> </ul>			
74AUP1G125_Q100 v.2	20190125	Product data sheet	-	74AUP1G125_Q100 v.1
Modifications:	<ul style="list-style-type: none"> <li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• Type numbers 74AUP1G125GM-Q100 (SOT886) and 74AUP1G125GS-Q100 (SOT1202) added.</li> </ul>			
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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