

# 74AUP2G02

## Low-power dual 2-input NOR gate

Rev. 10 — 24 July 2023

Product data sheet

## 1. General description

The 74AUP2G02 is a dual 2-input NOR gate. 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.

## 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)
- Low static power consumption;  $I_{CC} = 0.9 \mu\text{A}$  (maximum)
- Latch-up performance exceeds 100 mA per JESD78B 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
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 3A exceeds 5000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- 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			Version
	Temperature range	Name	Description	
<a href="#">74AUP2G02DC</a>	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	<a href="#">SOT765-1</a>
<a href="#">74AUP2G02GT</a>	-40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 × 1.95 × 0.5 mm	<a href="#">SOT833-1</a>
<a href="#">74AUP2G02GF</a>	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1 × 0.5 mm	<a href="#">SOT1089</a>
<a href="#">74AUP2G02GN</a>	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.2 × 1.0 × 0.35 mm	<a href="#">SOT1116</a>
<a href="#">74AUP2G02GS</a>	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1.0 × 0.35 mm	<a href="#">SOT1203</a>

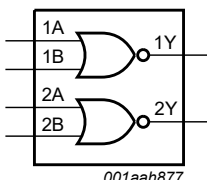
### 4. Marking

Table 2. Marking codes

Type number	Marking code[1]
74AUP2G02DC	p02
74AUP2G02GT	p02
74AUP2G02GF	pB
74AUP2G02GN	pB
74AUP2G02GS	pB

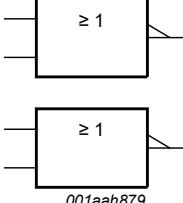
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

### 5. Functional diagram



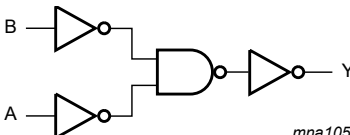
001aah877

**Fig. 1. Logic symbol**



001aah879

**Fig. 2. IEC logic symbol**

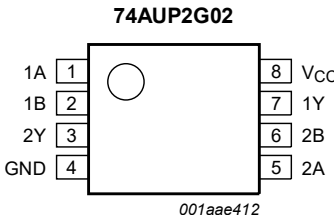


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**Fig. 3. Logic diagram**

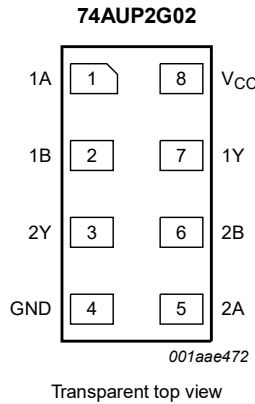
### 6. Pinning information

#### 6.1. Pinning



001aae412

**Fig. 4. Pin configuration SOT765-1 (VSSOP8)**



001aae472

Transparent top view

**Fig. 5. Pin configuration SOT833-1, SOT1089, SOT1116 and SOT1203 (XSON8)**

## 6.2. Pin description

Table 3. Pin description

Symbol	Pin	Description
1A, 2A	1, 5	data input
1B, 2B	2, 6	data input
GND	4	ground (0 V)
1Y, 2Y	7, 3	data output
V <sub>CC</sub>	8	supply voltage

## 7. Functional description

Table 4. Function table

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

Input		Output
nA	nB	nY
L	L	H
L	H	L
H	L	L
H	H	L

## 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 <sub>CC</sub>	supply voltage		-0.5	+4.6	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA
V <sub>I</sub>	input voltage	[1]	-0.5	+4.6	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < 0 V	-50	-	mA
V <sub>O</sub>	output voltage	Active mode and Power-down mode [1]	-0.5	+4.6	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CC</sub>	-	±20	mA
I <sub>CC</sub>	supply current		-	+50	mA
I <sub>GND</sub>	ground current		-50	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -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 SOT765-1 (VSSOP8) package: P<sub>tot</sub> derates linearly with 4.9 mW/K above 99 °C.

For SOT833-1 (XSON8) package: P<sub>tot</sub> derates linearly with 3.1 mW/K above 68 °C.

For SOT1089 (XSON8) package: P<sub>tot</sub> derates linearly with 4.0 mW/K above 88 °C.

For SOT1116 (XSON8) package: P<sub>tot</sub> derates linearly with 4.2 mW/K above 90 °C.

For SOT1203 (XSON8) package: P<sub>tot</sub> derates linearly with 3.6 mW/K above 81 °C.

## 9. Recommended operating conditions

Table 6. 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
$I_I$	input leakage current	$V_I = GND$ to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	$\pm 0.1$	$\mu$ A

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{OFF}$	power-off leakage current	$V_I$ 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	$V_I$ 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	$V_I = V_{CC} - 0.6\text{ V}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 3.3\text{ V}$ [1]	-	-	40	$\mu\text{A}$
$C_I$	input capacitance	$V_{CC} = 0\text{ V}$ to $3.6\text{ V}$ ; $V_I = \text{GND}$ or $V_{CC}$	-	0.8	-	$\text{pF}$
$C_O$	output capacitance	$V_O = \text{GND}$ ; $V_{CC} = 0\text{ V}$	-	1.7	-	$\text{pF}$
<b><math>T_{amb} = -40\text{ }^\circ\text{C}</math> to <math>+85\text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8\text{ V}$	$0.70 \times V_{CC}$	-	-	$\text{V}$
		$V_{CC} = 0.9\text{ V}$ to $1.95\text{ V}$	$0.65 \times V_{CC}$	-	-	$\text{V}$
		$V_{CC} = 2.3\text{ V}$ to $2.7\text{ V}$	1.6	-	-	$\text{V}$
		$V_{CC} = 3.0\text{ V}$ to $3.6\text{ V}$	2.0	-	-	$\text{V}$
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8\text{ V}$	-	-	$0.30 \times V_{CC}$	$\text{V}$
		$V_{CC} = 0.9\text{ V}$ to $1.95\text{ V}$	-	-	$0.35 \times V_{CC}$	$\text{V}$
		$V_{CC} = 2.3\text{ V}$ to $2.7\text{ V}$	-	-	0.7	$\text{V}$
		$V_{CC} = 3.0\text{ V}$ to $3.6\text{ V}$	-	-	0.9	$\text{V}$
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -20\text{ }\mu\text{A}$ ; $V_{CC} = 0.8\text{ V}$ to $3.6\text{ V}$	$V_{CC} - 0.1$	-	-	$\text{V}$
		$I_O = -1.1\text{ mA}$ ; $V_{CC} = 1.1\text{ V}$	$0.7 \times V_{CC}$	-	-	$\text{V}$
		$I_O = -1.7\text{ mA}$ ; $V_{CC} = 1.4\text{ V}$	1.03	-	-	$\text{V}$
		$I_O = -1.9\text{ mA}$ ; $V_{CC} = 1.65\text{ V}$	1.30	-	-	$\text{V}$
		$I_O = -2.3\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	1.97	-	-	$\text{V}$
		$I_O = -3.1\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	1.85	-	-	$\text{V}$
		$I_O = -2.7\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	2.67	-	-	$\text{V}$
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 20\text{ }\mu\text{A}$ ; $V_{CC} = 0.8\text{ V}$ to $3.6\text{ V}$	-	-	0.1	$\text{V}$
		$I_O = 1.1\text{ mA}$ ; $V_{CC} = 1.1\text{ V}$	-	-	$0.3 \times V_{CC}$	$\text{V}$
		$I_O = 1.7\text{ mA}$ ; $V_{CC} = 1.4\text{ V}$	-	-	0.37	$\text{V}$
		$I_O = 1.9\text{ mA}$ ; $V_{CC} = 1.65\text{ V}$	-	-	0.35	$\text{V}$
		$I_O = 2.3\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	-	-	0.33	$\text{V}$
		$I_O = 3.1\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	-	-	0.45	$\text{V}$
		$I_O = 2.7\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	-	-	0.33	$\text{V}$
	$I_O = 4.0\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	-	-	0.45	$\text{V}$	
$I_I$	input leakage current	$V_I = \text{GND}$ to $3.6\text{ V}$ ; $V_{CC} = 0\text{ V}$ to $3.6\text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I$ 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	$V_I$ 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	$V_I = V_{CC} - 0.6\text{ V}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 3.3\text{ V}$ [1]	-	-	50	$\mu\text{A}$

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 0.8 V	0.75 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	0.70 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	-	-	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 0.8 V	-	-	0.25 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.30 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	0.9	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.11	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.6 × V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	0.93	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.17	-	-	V
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	1.77	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.67	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.40	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.11	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.33 × V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.41	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.39	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.36	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.50	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.36	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.75	μA
		V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V	-	-	±0.75	μA
I <sub>OFF</sub>	power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V	-	-	±0.75	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V	-	-	±0.75	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	1.4	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V [1]	-	-	75	μA

[1] One input at V<sub>CC</sub> - 0.6 V, other input at V<sub>CC</sub> or GND.

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

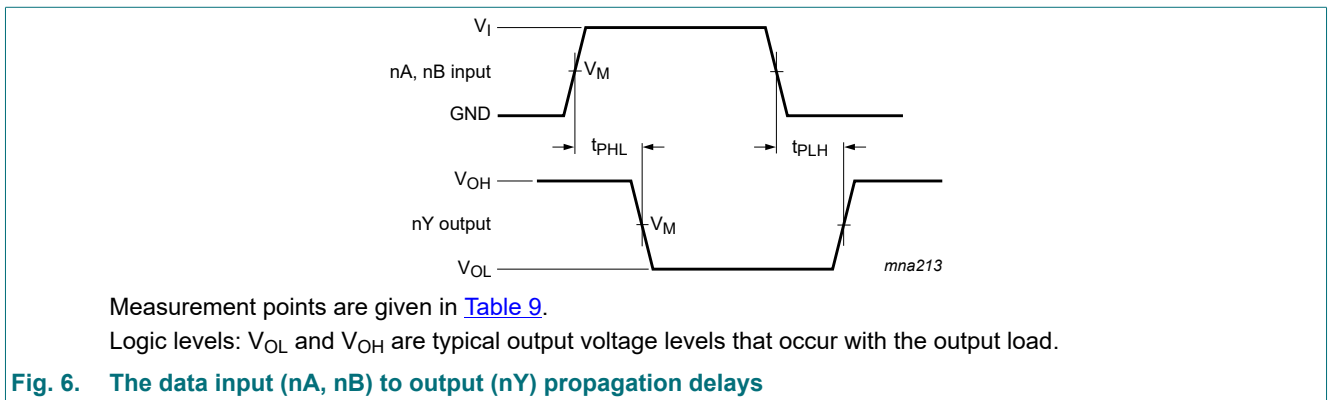
Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 7.

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
<b>C<sub>L</sub> = 5 pF</b>										
t <sub>pd</sub>	propagation delay	nA, nB to nY; see Fig. 6 [2]								
		V <sub>CC</sub> = 0.8 V	-	17.0	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.5	5.1	10.8	2.1	12.1	2.1	13.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.6	3.7	6.7	1.4	7.8	1.4	8.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.3	3.0	5.3	1.1	6.2	1.1	6.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	2.4	3.9	0.9	4.6	0.9	5.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.2	3.4	0.8	4.0	0.8	4.4	ns
<b>C<sub>L</sub> = 10 pF</b>										
t <sub>pd</sub>	propagation delay	nA, nB to nY; see Fig. 6 [2]								
		V <sub>CC</sub> = 0.8 V	-	20.4	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.4	6.0	12.8	2.2	14.3	2.2	15.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.9	4.3	7.9	1.7	9.2	1.7	10.2	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.6	3.6	6.2	1.5	7.3	1.5	8.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.4	3.0	4.7	1.2	5.6	1.2	6.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	2.7	4.2	1.2	5.0	1.2	5.5	ns
<b>C<sub>L</sub> = 15 pF</b>										
t <sub>pd</sub>	propagation delay	nA, nB to nY; see Fig. 6 [2]								
		V <sub>CC</sub> = 0.8 V	-	23.9	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.4	6.8	14.6	3.1	16.4	3.1	18.1	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.3	4.8	8.9	2.0	10.4	2.0	11.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	4.0	7.0	1.7	8.3	1.7	9.2	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	3.4	5.4	1.5	6.3	1.5	7.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.6	3.2	4.8	1.4	5.7	1.4	6.3	ns
<b>C<sub>L</sub> = 30 pF</b>										
t <sub>pd</sub>	propagation delay	nA, nB to nY; see Fig. 6 [2]								
		V <sub>CC</sub> = 0.8 V	-	34.2	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.6	9.0	19.9	4.1	22.4	4.1	24.7	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.4	6.4	11.8	2.9	13.9	2.9	15.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.6	5.3	9.3	2.3	11.1	2.3	12.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.4	4.5	7.1	2.1	8.5	2.1	9.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.3	4.2	6.4	2.1	7.7	2.1	8.5	ns

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
<b>C<sub>L</sub> = 5 pF, 10 pF, 15 pF and 30 pF</b>										
C <sub>PD</sub>	power dissipation capacitance	f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [3]								
		V <sub>CC</sub> = 0.8 V	-	2.6	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	2.7	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	2.8	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	2.9	-	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.3	-	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	3.8	-	-	-	-	-	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] 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.

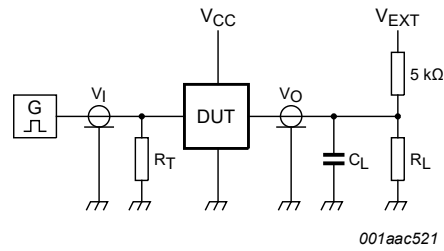
### 11.1. Waveform and test circuit



**Table 9. Measurement points**

Supply voltage	Output	Input		
V <sub>CC</sub>	V <sub>M</sub>	V <sub>M</sub>	V <sub>I</sub>	t <sub>r</sub> = t <sub>f</sub>
0.8 V to 3.6 V	0.5 × V <sub>CC</sub>	0.5 × V <sub>CC</sub>	V <sub>CC</sub>	≤ 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. 7. 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]  $R_L = 5 \text{ k}\Omega$  when measuring enable and disable times.

$R_L = 1 \text{ M}\Omega$  when measuring propagation delays, set-up and hold times and pulse width.

## 12. Package outline

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm

SOT765-1

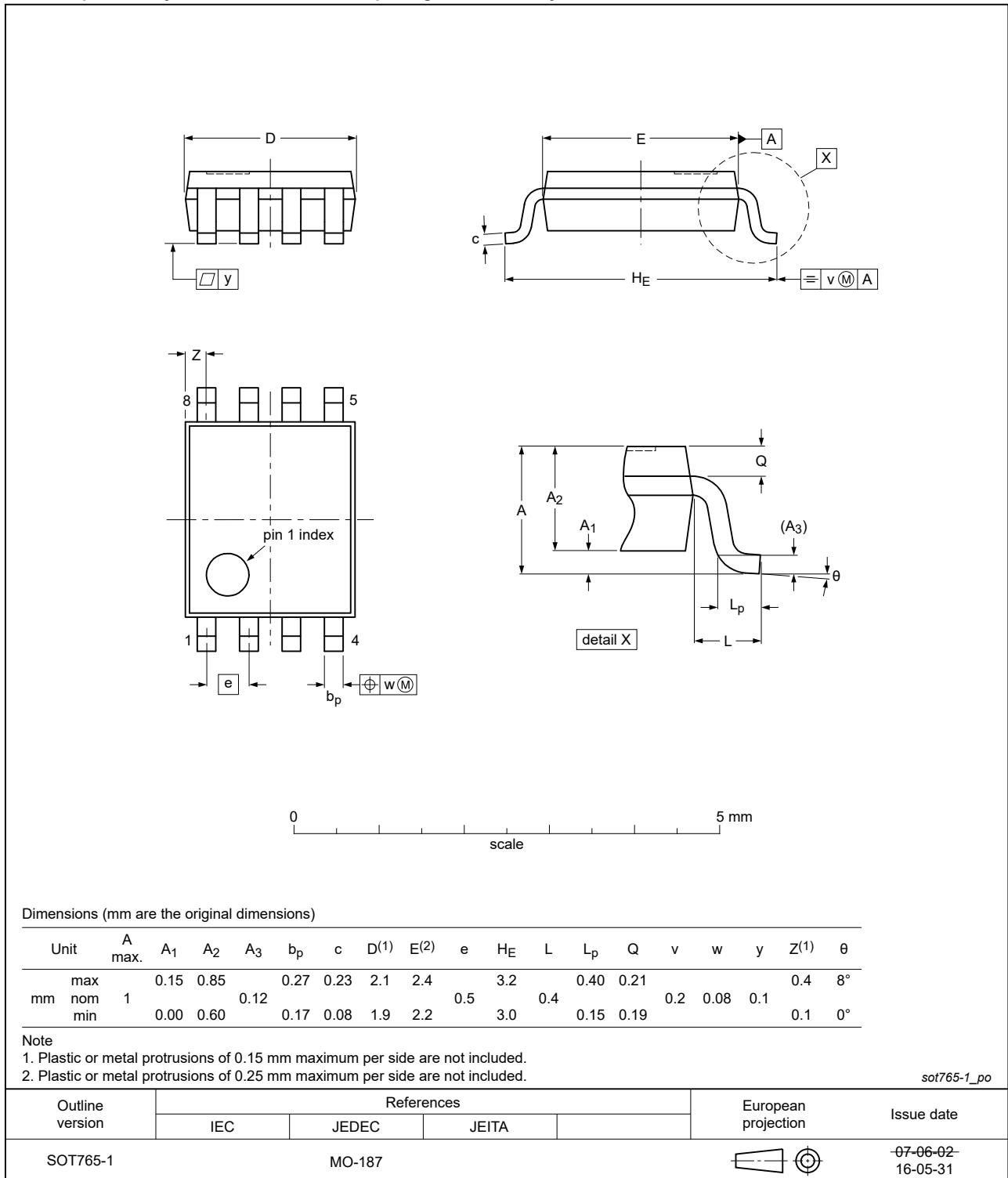


Fig. 8. Package outline SOT765-1 (VSSOP8)

XSON8: plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm

SOT833-1

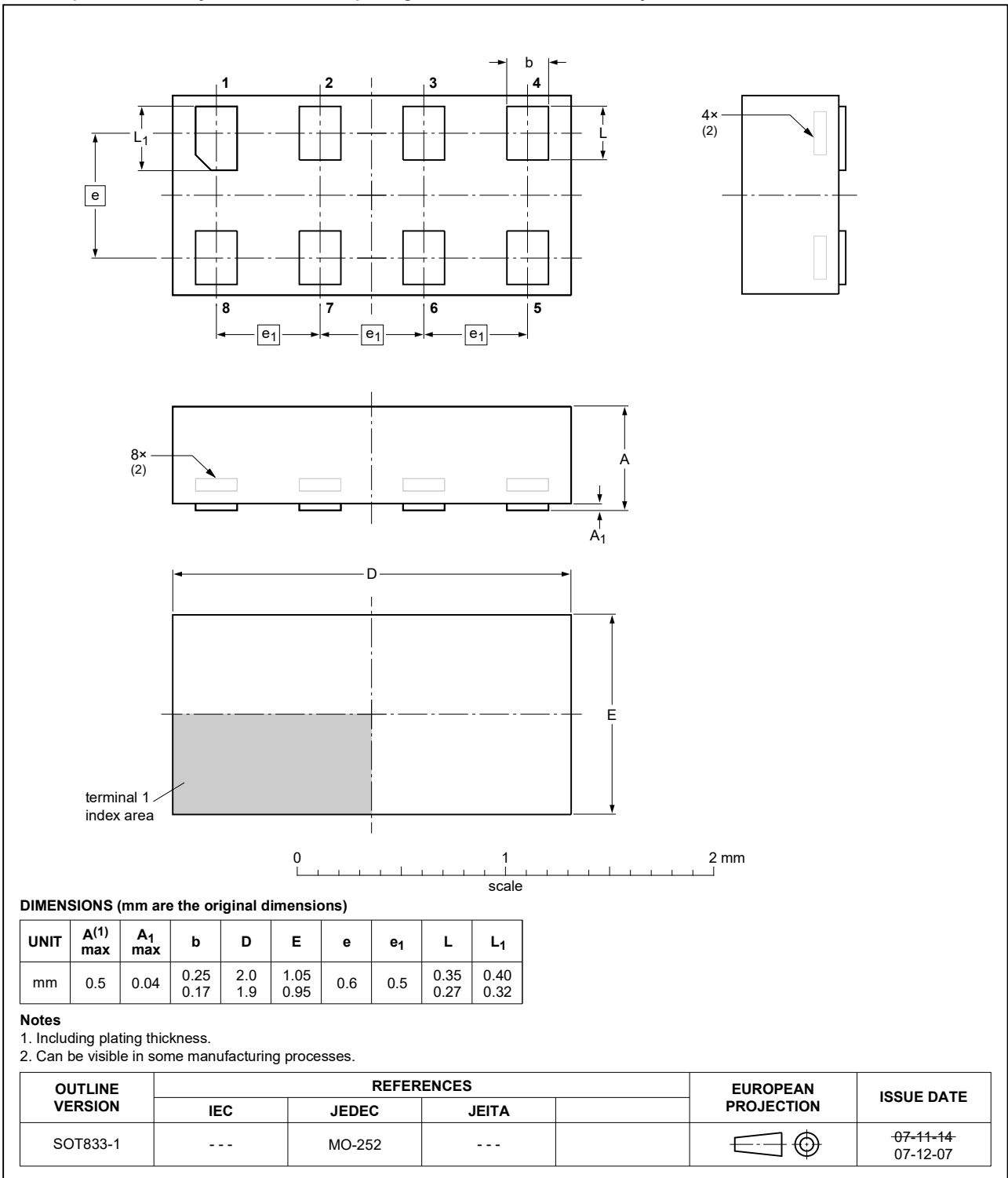


Fig. 9. Package outline SOT833-1 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1 x 0.5 mm

SOT1089

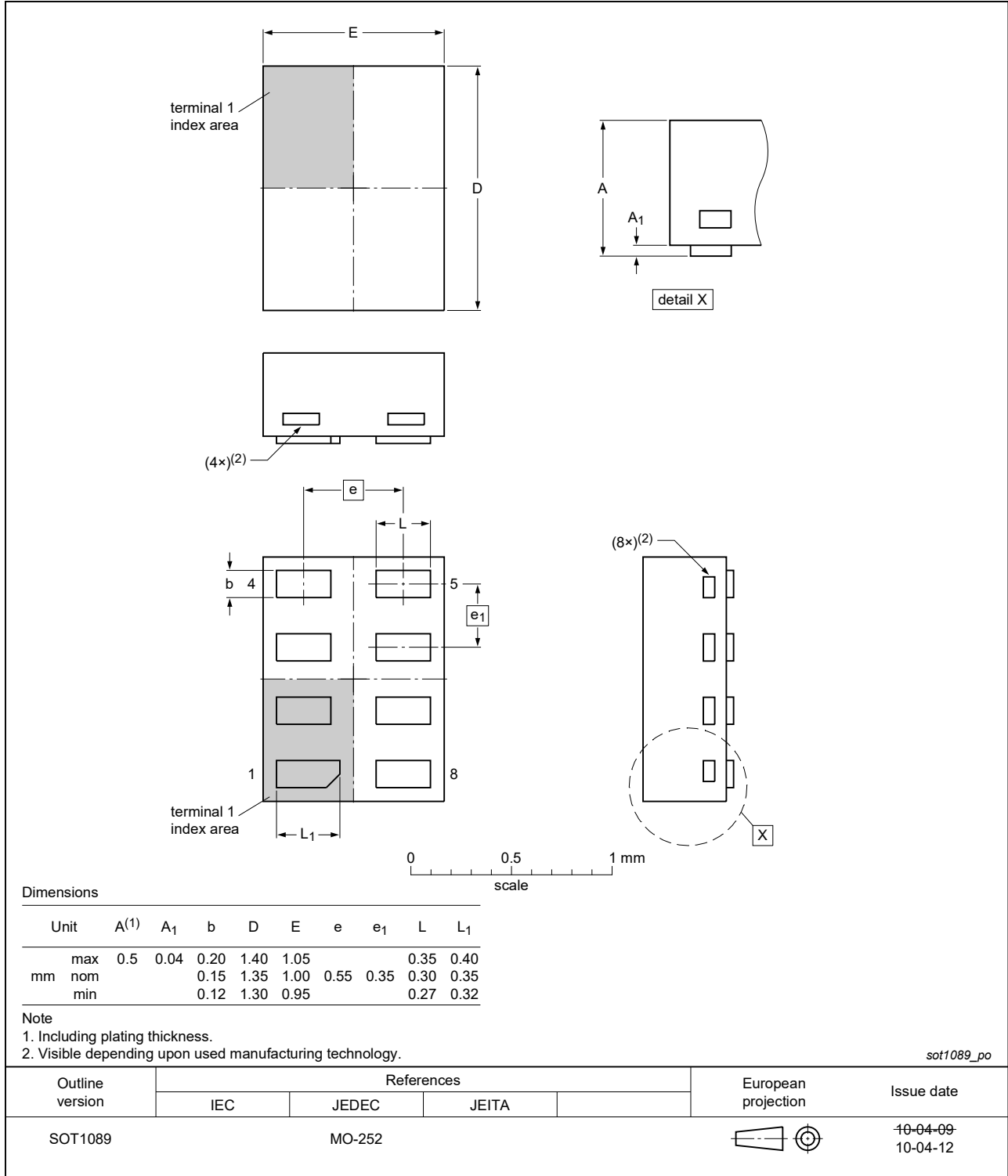


Fig. 10. Package outline SOT1089 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.2 x 1.0 x 0.35 mm

SOT1116

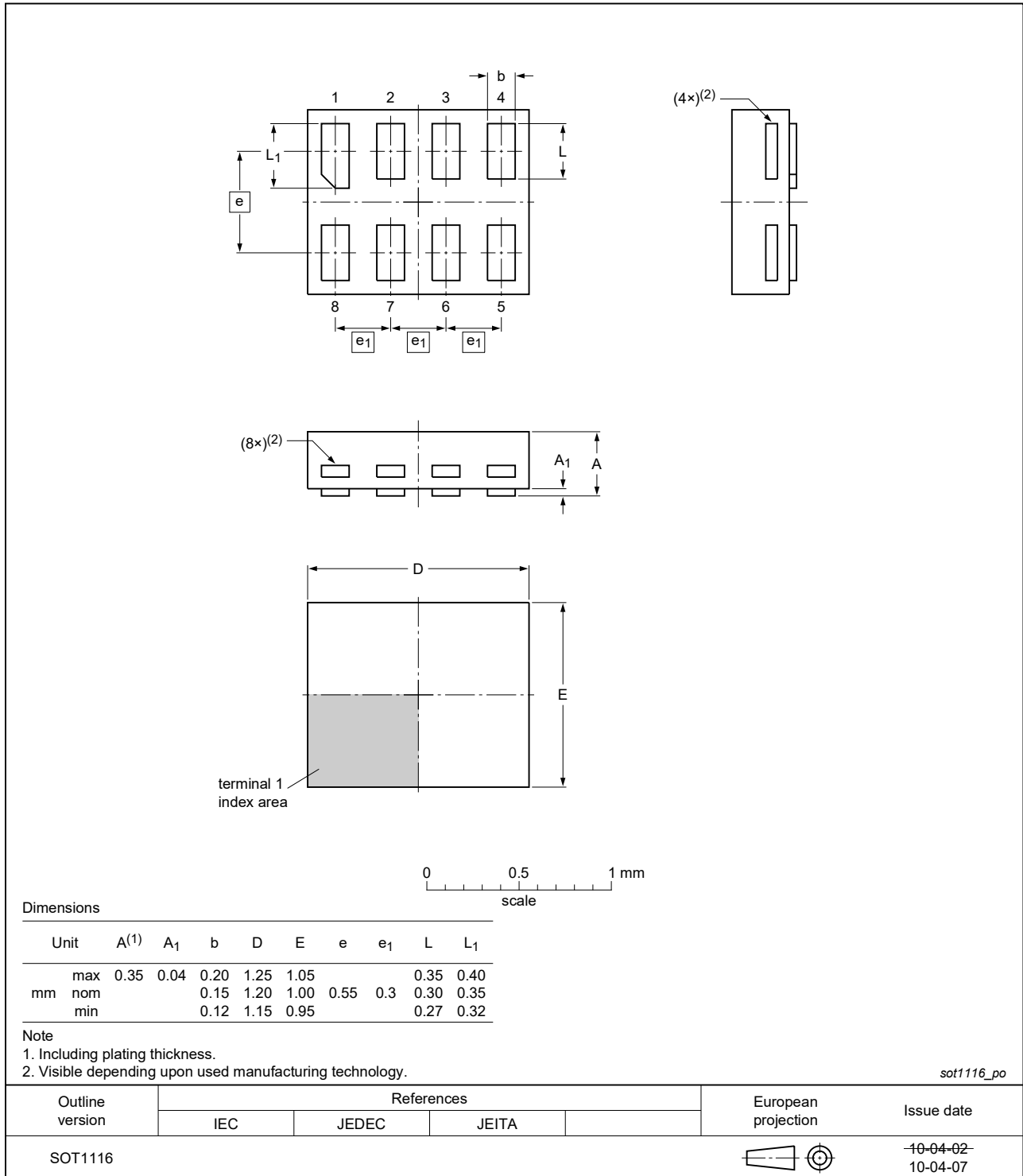


Fig. 11. Package outline SOT1116 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1.0 x 0.35 mm

SOT1203

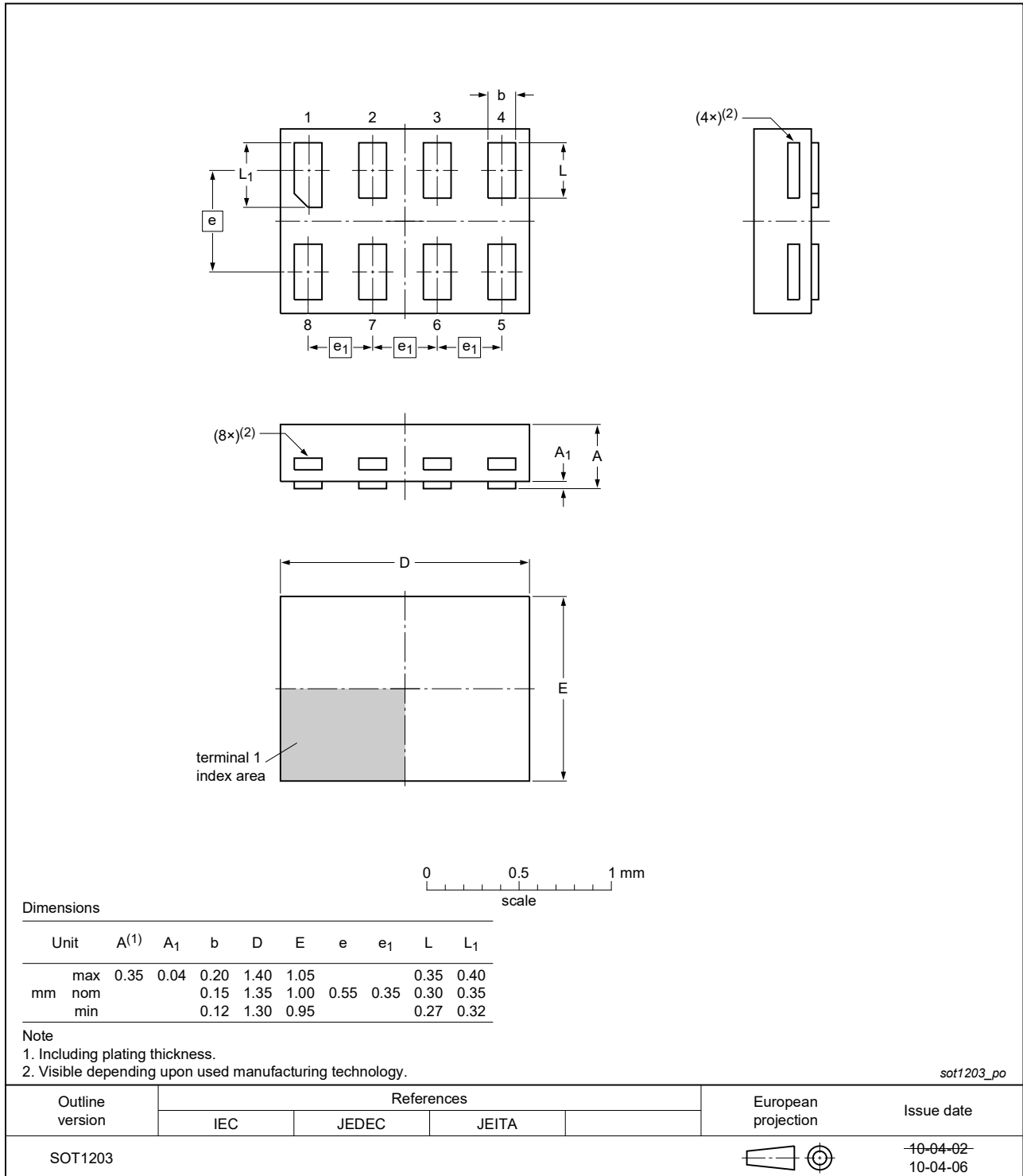


Fig. 12. Package outline SOT1203 (XSON8)

## 13. Abbreviations

Table 11. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model

## 14. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G02 v.10	20230724	Product data sheet	-	74AUP2G02 v.9
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li> </ul>			
74AUP2G02 v.9	20210727	Product data sheet	-	74AUP2G02 v.8
Modifications:	<ul style="list-style-type: none"> <li>• Type number 74AUP2G02GM SOT902-2 (XQFN8) removed.</li> <li>• <a href="#">Section 1</a> updated.</li> <li>• <a href="#">Section 8</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> </ul>			
74AUP2G02 v.8	20190212	Product data sheet	-	74AUP2G02 v.7
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 number 74AUP2G02GD SOT996-2 (XSON8) removed.</li> <li>• Package outline drawing <a href="#">Fig. 8</a> SOT765-1 (VSSOP8) updated.</li> <li>• Package outline drawing SOT902-2 (XQFN8) updated.</li> </ul>			
74AUP2G02 v.7	20130204	Product data sheet	-	74AUP2G02 v.6
Modifications:	<ul style="list-style-type: none"> <li>• For type number 74AUP2G02GD XSON8U has changed to XSON8.</li> </ul>			
74AUP2G02 v.6	20120803	Product data sheet	-	74AUP2G02 v.5
74AUP2G02 v.5	20111202	Product data sheet	-	74AUP2G02 v.4
74AUP2G02 v.4	20101109	Product data sheet	-	74AUP2G02 v.3
74AUP2G02 v.3	20081211	Product data sheet	-	74AUP2G02 v.2
74AUP2G02 v.2	20080319	Product data sheet	-	74AUP2G02 v.1
74AUP2G02 v.1	20060828	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".
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