

# 74AUP1G00

## Low-power 2-input NAND gate

Rev. 8 — 13 January 2022

Product data sheet

## 1. General description

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The 74AUP1G00 is a single 2-input NAND 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 damaging backflow current through the device when it is powered down.

## 2. Features and benefits

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- Wide supply voltage range from 0.8 V to 3.6 V
- CMOS low power dissipation
- 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 (1.65 V to 1.95 V)
  - JESD8-5 (2.3 V to 2.7 V)
  - JESD8C (2.7 V to 3.6 V)
- ESD protection:
  - HBM JESD22-A114F Class 3A exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 V
- Low static power consumption;  $I_{CC} = 0.9 \mu\text{A}$  (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Overvoltage tolerant inputs 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
74AUP1G00GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74AUP1G00GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
74AUP1G00GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm	SOT1115
74AUP1G00GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm	SOT1202
74AUP1G00GX	-40 °C to +125 °C	X2SON5	plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 × 0.8 × 0.32 mm	SOT1226-3

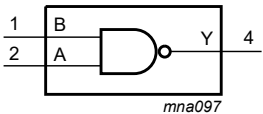
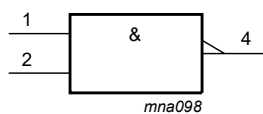
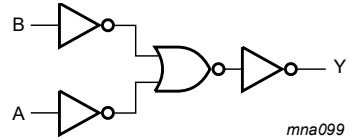
### 4. Marking

Table 2. Marking

Type number	Marking code [1]
74AUP1G00GW	pA
74AUP1G00GM	pA
74AUP1G00GN	pA
74AUP1G00GS	pA
74AUP1G00GX	pA

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

### 5. Functional diagram

 <p><i>mna097</i></p>	 <p><i>mna098</i></p>	 <p><i>mna099</i></p>
<b>Fig. 1. Logic symbol</b>	<b>Fig. 2. IEC logic symbol</b>	<b>Fig. 3. Logic diagram</b>

## 6. Pinning information

### 6.1. Pinning

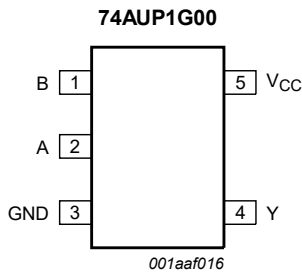


Fig. 4. Pin configuration SOT353-1 (TSSOP5)

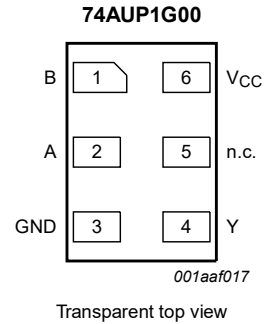


Fig. 5. Pin configuration SOT886 (XSON6)

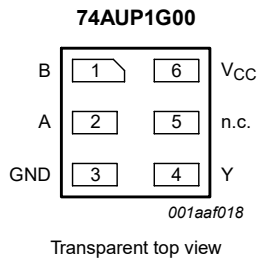


Fig. 6. Pin configuration SOT1115 and SOT1202 (XSON6)

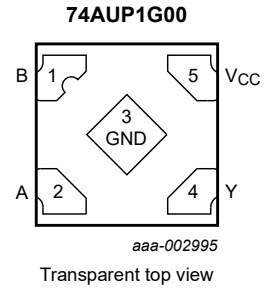


Fig. 7. Pin configuration SOT1226-3 (X2SON5)

### 6.2. Pin description

Table 3. Pin description

Symbol	Pin		Description
	TSSOP5 and X2SON5	XSON6	
B	1	1	data input
A	2	2	data input
GND	3	3	ground (0 V)
Y	4	4	data output
n.c.	-	5	not connected
V <sub>CC</sub>	5	6	supply voltage

## 7. Functional description

**Table 4. Function table**

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

Input		Output
A	B	Y
L	L	H
L	H	H
H	L	H
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
$V_{CC}$	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]	$V_{CC} + 0.5$	V
		Power-down mode; $V_{CC} = 0$ V	[1]	+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 minimum 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 SOT1115 (XSON6) package:  $P_{tot}$  derates linearly with 3.2 mW/K above 71 °C.

For SOT1202 (XSON6) package:  $P_{tot}$  derates linearly with 3.3 mW/K above 74 °C.

For SOT1226-3 (X2SON5) package:  $P_{tot}$  derates linearly with 3.0 mW/K above 67 °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>T<sub>amb</sub> = 25 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 0.8 V	0.70×V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	0.65×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	-	-	0.30×V <sub>CC</sub>	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.35×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> - 0.1	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.75×V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	1.11	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.32	-	-	V
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	2.05	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.9	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.72	-	-	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	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3×V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.31	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.31	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.31	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.44	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.31	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	-	-	±0.1	μA
		V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V	-	-	±0.2	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	-	-	±0.2	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	-	-	±0.2	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	-	-	0.5	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]	-	-	40	μA
C <sub>I</sub>	input capacitance	V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND or V <sub>CC</sub>	-	0.8	-	pF
C <sub>O</sub>	output capacitance	V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V	-	1.7	-	pF

Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>								
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 0.8 V	0.70×V <sub>CC</sub>	-	-	V		
		V <sub>CC</sub> = 0.9 V to 1.95 V	0.65×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	-	-	0.30×V <sub>CC</sub>	V		
		V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.35×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> - 0.1	-	-	V		
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.7×V <sub>CC</sub>	-	-	V		
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	1.03	-	-	V		
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.30	-	-	V		
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	1.97	-	-	V		
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.85	-	-	V		
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.67	-	-	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	-	-	0.1	V		
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3×V <sub>CC</sub>	V		
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.37	V		
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.35	V		
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.33	V		
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.45	V		
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.33	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	-	-	±0.5	μA		
		V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V	-	-	±0.5	μA		
		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	-	-	±0.6	μA		
		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	-	-	0.9	μA		
		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]	-	-	50	μA		
		<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		

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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
I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.30	-	-	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>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.50	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
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. 9

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 5 pF</b>						
t <sub>pd</sub>	propagation delay	A, B to Y; see Fig. 8 [2]				
		V <sub>CC</sub> = 0.8 V	-	17.5	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.5	5.3	11.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.0	3.8	6.8	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.6	3.1	5.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.3	2.5	4.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.2	3.6	ns

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 10 pF</b>						
t <sub>pd</sub>	propagation delay	A, B to Y; see Fig. 8 [2]				
		V <sub>CC</sub> = 0.8 V	-	21.0	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.4	6.1	13.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.4	4.4	7.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	3.7	6.2	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.4	3.0	4.7	ns
V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	2.8	4.3	ns		
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 15 pF</b>						
t <sub>pd</sub>	propagation delay	A, B to Y; see Fig. 8 [2]				
		V <sub>CC</sub> = 0.8 V	-	24.5	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.4	6.9	14.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.8	5.0	8.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	4.1	7.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	3.5	5.3	ns
V <sub>CC</sub> = 3.0 V to 3.6 V	1.6	3.2	4.9	ns		
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 30 pF</b>						
t <sub>pd</sub>	propagation delay	A, B to Y; see Fig. 8 [2]				
		V <sub>CC</sub> = 0.8 V	-	34.8	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.6	9.2	20.1	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	6.5	11.8	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.6	5.4	9.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.4	4.6	7.1	ns
V <sub>CC</sub> = 3.0 V to 3.6 V	2.3	4.3	6.5	ns		
<b>T<sub>amb</sub> = 25 °C</b>						
C <sub>PD</sub>	power dissipation capacitance	f = 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	-	2.8	-	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	-	3.1	-	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] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

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

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.

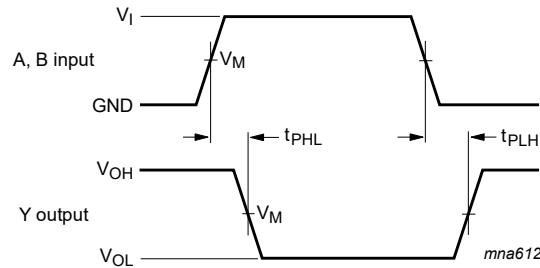
Table 9. Dynamic characteristics

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

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
<b>C<sub>L</sub> = 5 pF</b>							
t <sub>pd</sub>	propagation delay	A, B to Y; see Fig. 8 [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.1	12.2	2.1	13.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.8	7.8	1.8	8.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.4	6.2	1.4	6.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.1	4.7	1.1	5.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	4.2	1.0	4.7	ns
<b>C<sub>L</sub> = 10 pF</b>							
t <sub>pd</sub>	propagation delay	A, B to Y; see Fig. 8 [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.2	14.4	2.2	15.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	9.2	2.2	10.2	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	7.3	1.9	8.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.3	5.6	1.3	6.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.2	4.9	1.2	5.4	ns
<b>C<sub>L</sub> = 15 pF</b>							
t <sub>pd</sub>	propagation delay	A, B to Y; see Fig. 8 [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.1	16.5	3.1	18.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.5	10.5	2.5	11.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	8.3	2.0	9.2	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	6.4	1.5	7.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.4	5.7	1.4	6.3	ns
<b>C<sub>L</sub> = 30 pF</b>							
t <sub>pd</sub>	propagation delay	A, B to Y; see Fig. 8 [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.1	22.6	4.1	24.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.9	14.0	2.9	15.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	11.1	2.3	12.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	8.5	2.1	9.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.1	7.6	2.1	8.4	ns

[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

11.1. Waveforms and test circuit



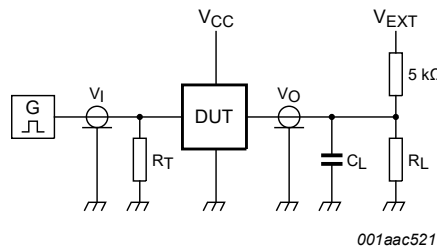
Measurement points are given in [Table 10](#).

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

Fig. 8. The data input (A or B) to output (Y) propagation delays

Table 10. Measurement points

Supply voltage	Input			Output
$V_{CC}$	$V_M$	$V_I$	$t_r = t_f$	$V_M$
0.8 V to 3.6 V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 3.0 \text{ ns}$	$0.5 \times V_{CC}$



Test data is given in [Table 11](#).

Definitions for test circuit:

$R_L$  = Load resistance;

$C_L$  = Load capacitance including jig and probe capacitance;

$R_T$  = Termination resistance should be equal to the output impedance  $Z_o$  of the pulse generator;

$V_{EXT}$  = External voltage for measuring switching times.

Fig. 9. Test circuit for measuring switching times

Table 11. Test data

Supply voltage	Load		$V_{EXT}$		
$V_{CC}$	$C_L$	$R_L$ [1]	$t_{PLH}, t_{PHL}$	$t_{PZH}, t_{PHZ}$	$t_{PZL}, t_{PLZ}$
0.8 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	5 kΩ or 1 MΩ	open	GND	$2 \times V_{CC}$

[1] For measuring enable and disable times  $R_L = 5 \text{ k}\Omega$ .  
For measuring propagation delays, setup and hold times and pulse width  $R_L = 1 \text{ M}\Omega$ .

## 12. Package outline

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

SOT353-1

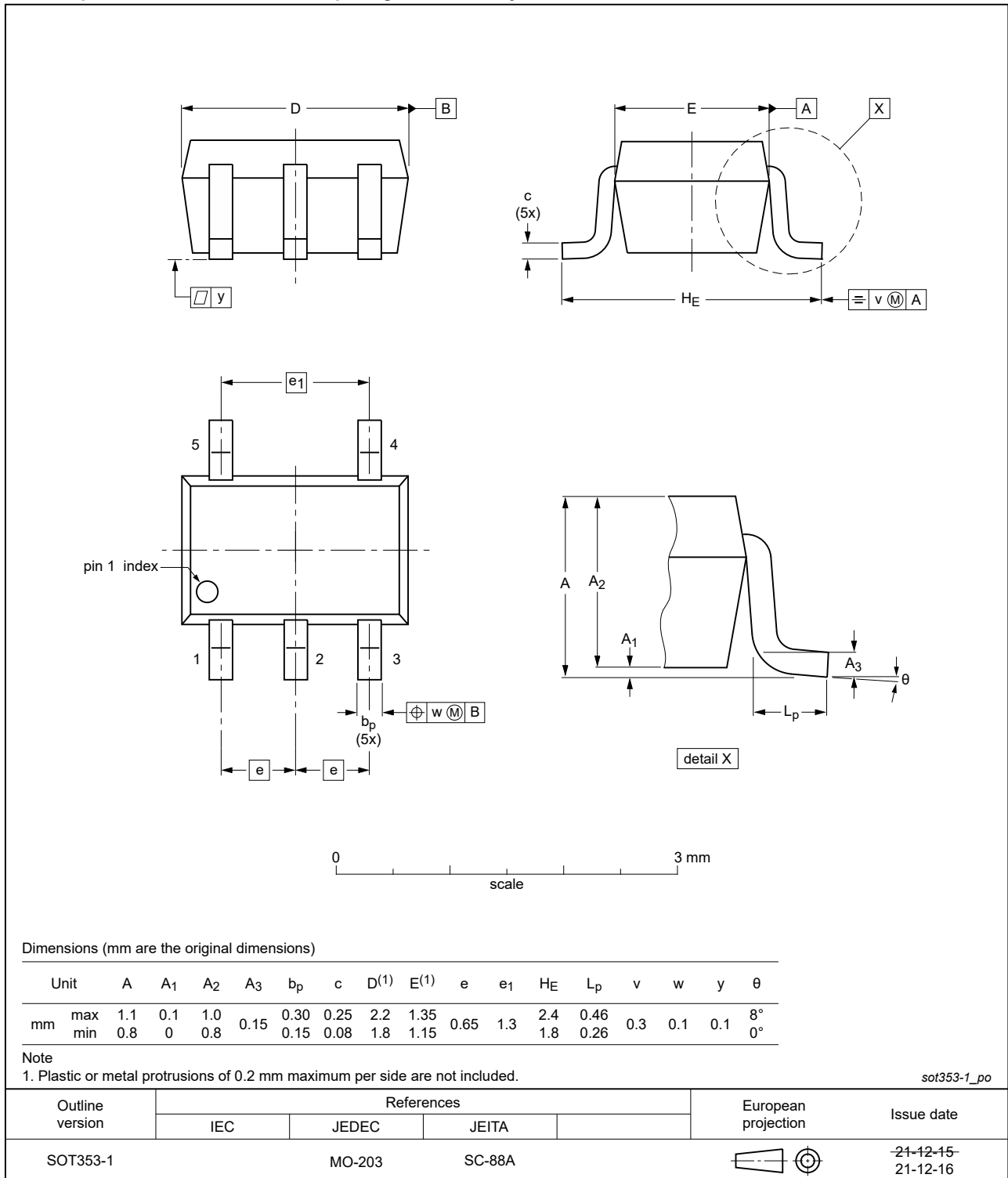


Fig. 10. Package outline SOT353-1 (TSSOP5)

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

SOT886

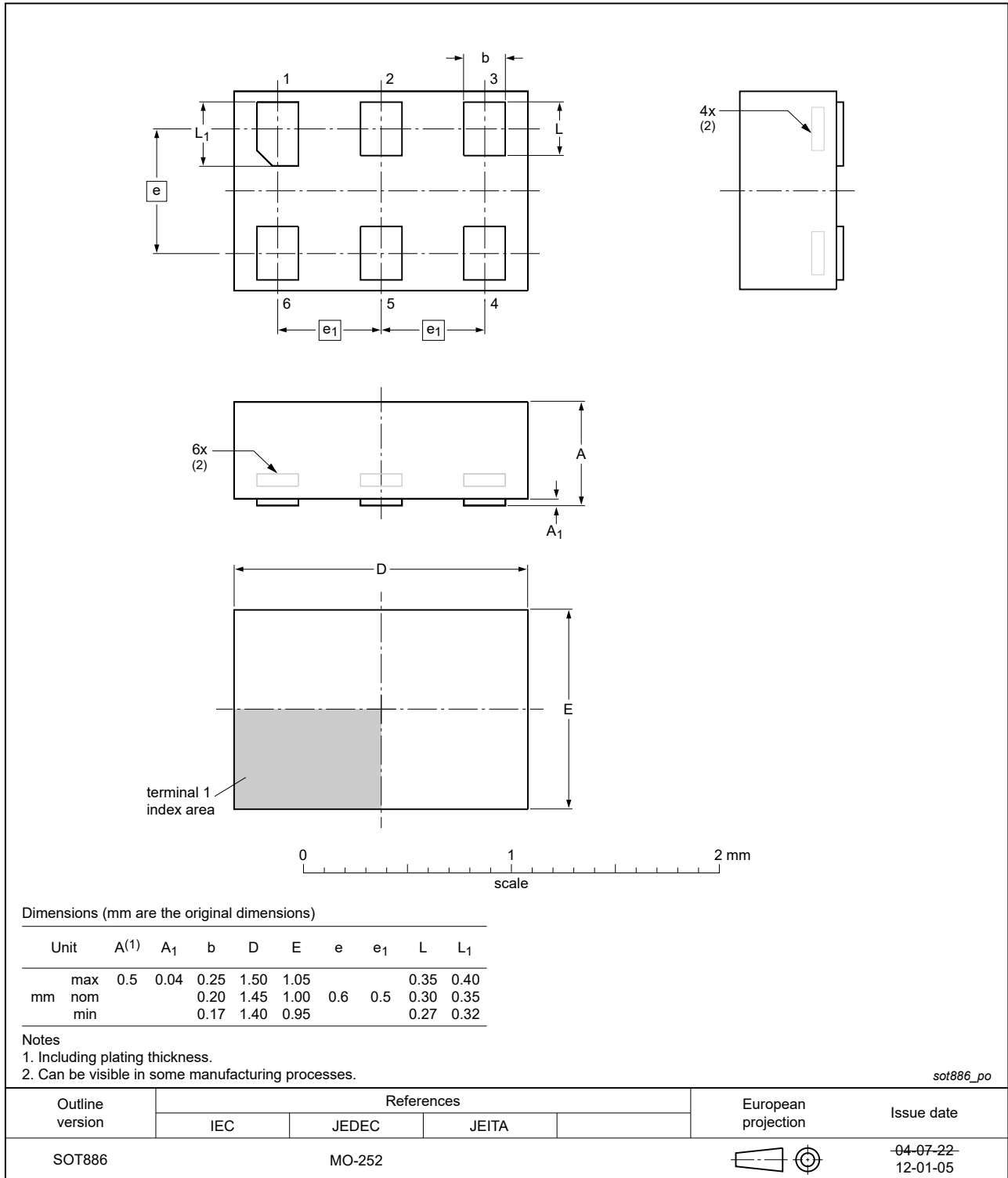


Fig. 11. Package outline SOT886 (XSON6)

XSON6: extremely thin small outline package; no leads;  
6 terminals; body 0.9 x 1.0 x 0.35 mm

SOT1115

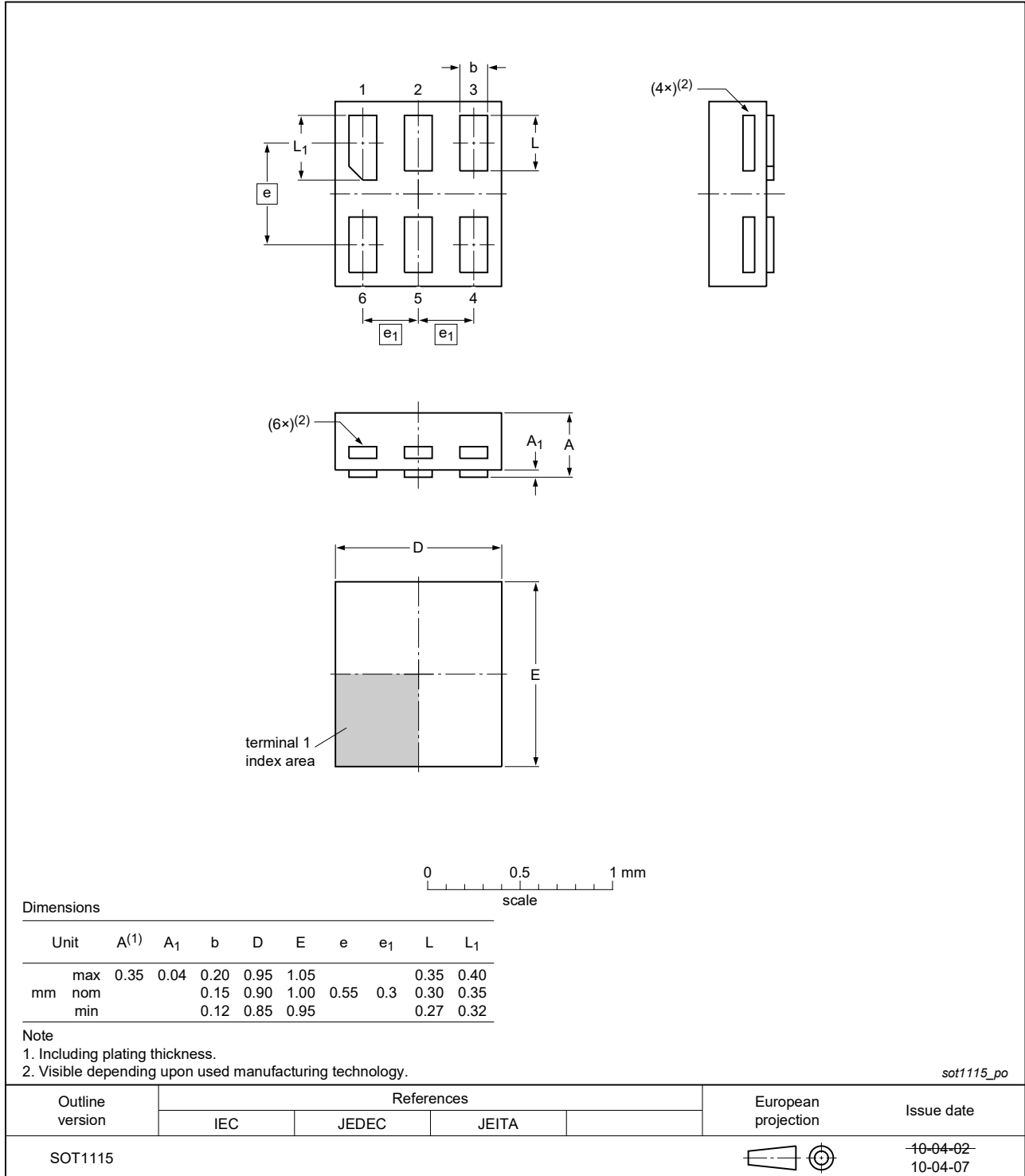


Fig. 12. Package outline SOT1115 (XSON6)

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

SOT1202

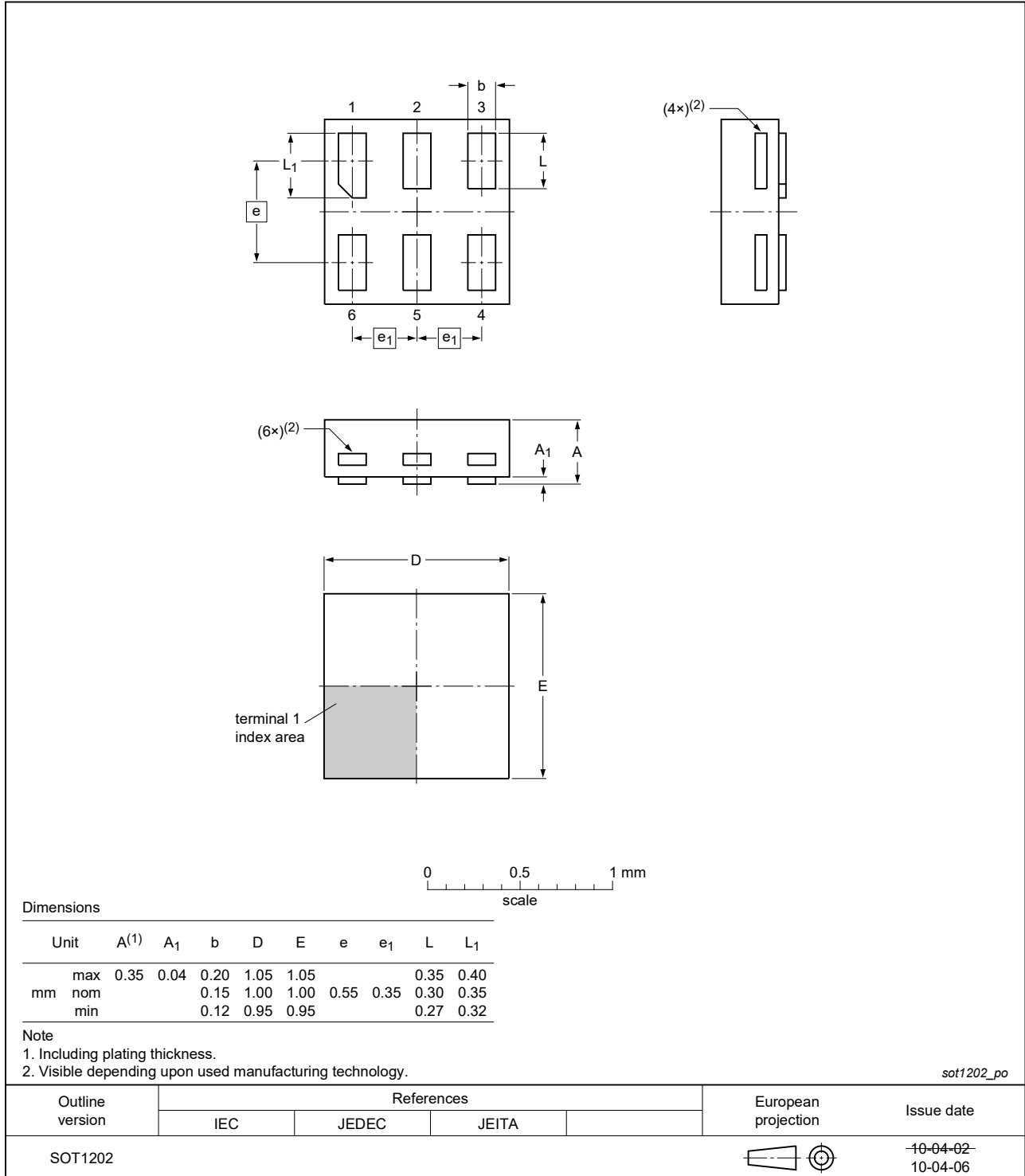


Fig. 13. Package outline SOT1202 (XSON6)

X2SON5: plastic thermal enhanced extremely thin small outline package; no leads;  
5 terminals; body 0.8 x 0.8 x 0.32 mm

SOT1226-3

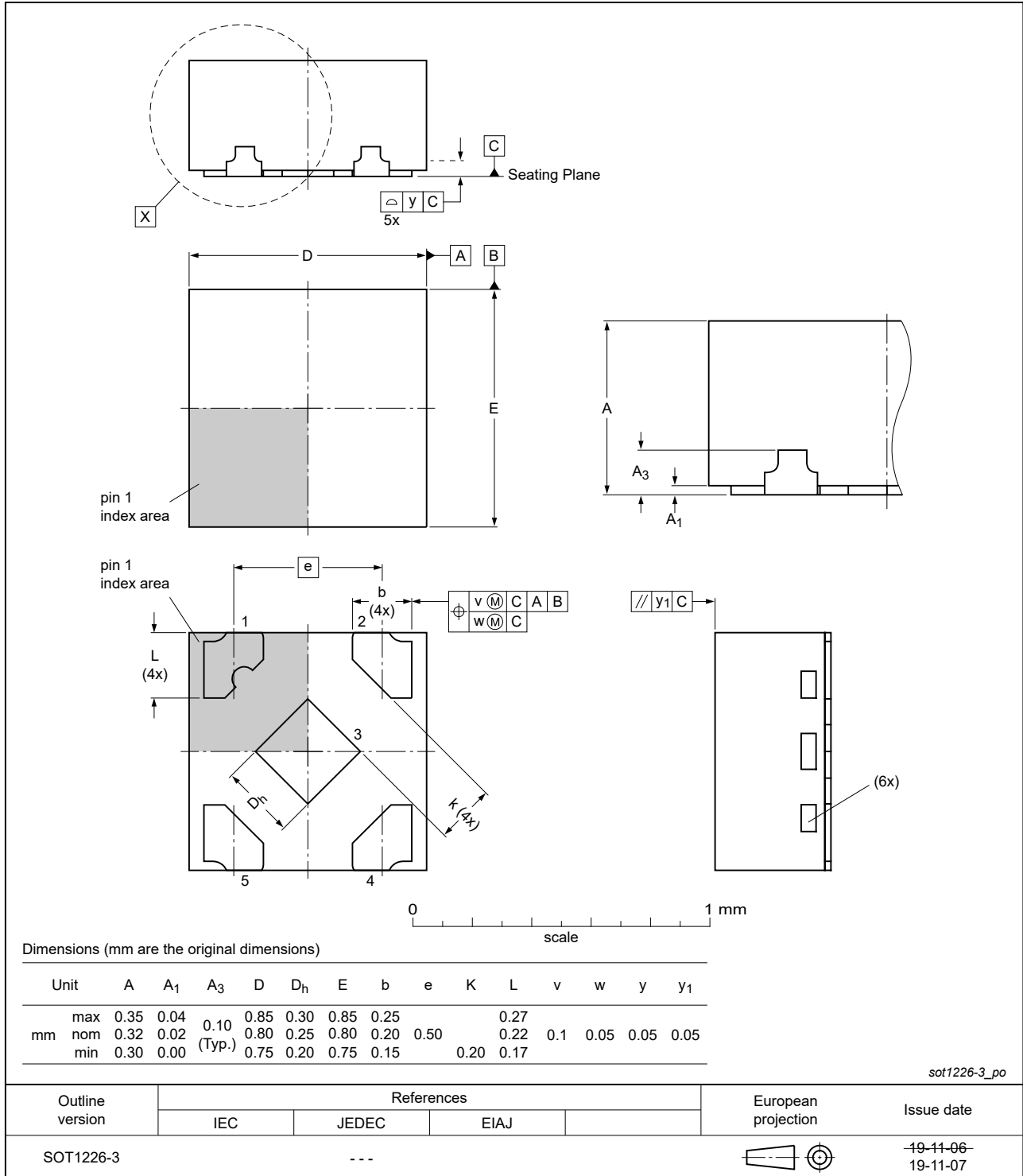


Fig. 14. Package outline SOT1226-3 (X2SON5)

## 13. Abbreviations

Table 12. Abbreviations

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

## 14. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1G00 v.8	20220113	Product data sheet	-	74AUP1G00 v.7
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Section 1</a> and <a href="#">Section 2</a> updated.</li> <li>• <a href="#">Table 5</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> <li>• Type number 74AUP1G00GF (SOT891) removed.</li> <li>• SOT1226 (X2SON5) package changed to SOT1226-3 (X2SON5) package.</li> <li>• <a href="#">Fig. 10</a>: Package outline drawing for SOT353-1 (TSSOP5) has changed.</li> </ul>			
74AUP1G00 v.7	20190423	Product data sheet	-	74AUP1G00 v.6
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>• Pin configuration drawing SOT1226 (X2SON5) updated.</li> </ul>			
74AUP1G00 v.6	20120627	Product data sheet	-	74AUP1G00 v.5
Modifications:	<ul style="list-style-type: none"> <li>• Added type number 74AUP1G00GX (SOT1226).</li> </ul>			
74AUP1G00 v.5	20120316	Product data sheet	-	74AUP1G00 v.4
Modifications:	<ul style="list-style-type: none"> <li>• Package outline drawing of SOT886 (<a href="#">Fig. 11</a>) modified.</li> </ul>			
74AUP1G00 v.4	20111115	Product data sheet	-	74AUP1G00 v.3
Modifications:	<ul style="list-style-type: none"> <li>• Legal pages updated.</li> </ul>			
74AUP1G00 v.3	20101007	Product data sheet	-	74AUP1G00 v.2
74AUP1G00 v.2	20060629	Product data sheet	-	74AUP1G00 v.1
74AUP1G00 v.1	20050711	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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Date of release: 13 January 2022