

# 74AUP1G240

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

Rev. 4 — 29 June 2012

Product data sheet

## 1. General description

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The 74AUP1G240 provides the single inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input ( $\overline{OE}$ ). A HIGH level at pin  $\overline{OE}$  causes the output to assume a high-impedance OFF-state.

This device has the input-disable feature, which allows floating input signals. The inputs are disabled when the output enable input  $\overline{OE}$  is HIGH.

Schmitt-trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire  $V_{CC}$  range from 0.8 V to 3.6 V.

This device ensures a very low static and dynamic power consumption across the entire  $V_{CC}$  range from 0.8 V to 3.6 V.

This device is fully specified for partial Power-down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

## 2. Features and benefits

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- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- Complies with JEDEC standards:
  - ◆ JESD8-12 (0.8 V to 1.3 V)
  - ◆ JESD8-11 (0.9 V to 1.65 V)
  - ◆ JESD8-7 (1.2 V to 1.95 V)
  - ◆ JESD8-5 (1.8 V to 2.7 V)
  - ◆ JESD8-B (2.7 V to 3.6 V)
- ESD protection:
  - ◆ HBM JESD22-A114F 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
- 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
- Multiple package options
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$



### 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74AUP1G240GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74AUP1G240GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
74AUP1G240GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm	SOT891
74AUP1G240GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm	SOT1115
74AUP1G240GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm	SOT1202
74AUP1G240GX	-40 °C to +125 °C	X2SON5	X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 × 0.8 × 0.35 mm	SOT1226

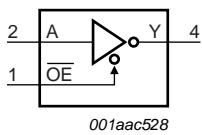
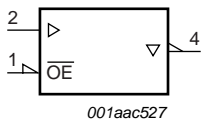
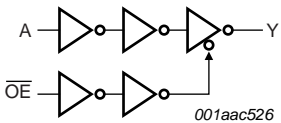
### 4. Marking

Table 2. Marking

Type number	Marking code <sup>[1]</sup>
74AUP1G240GW	p2
74AUP1G240GM	p2
74AUP1G240GF	p2
74AUP1G240GN	p2
74AUP1G240GS	p2
74AUP1G240GX	p2

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

### 5. Functional diagram

 <p>001aac528</p>	 <p>001aac527</p>	 <p>001aac526</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

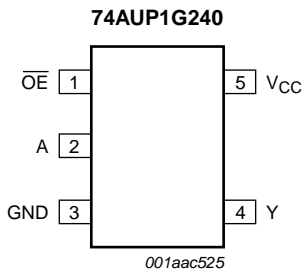


Fig 4. Pin configuration SOT353-1

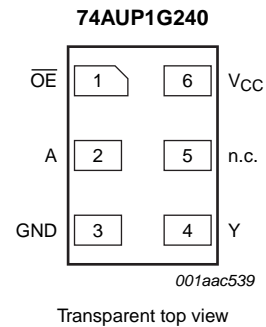


Fig 5. Pin configuration SOT886

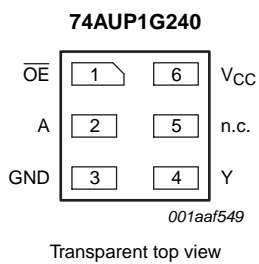


Fig 6. Pin configuration SOT891, SOT1115 and SOT1202

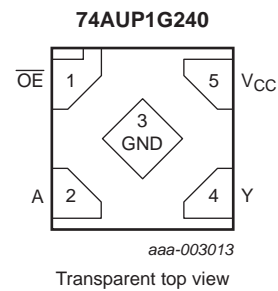


Fig 7. Pin configuration SOT1226 (X2SON5)

### 6.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	TSSOP5 and X2SON5	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 <sub>CC</sub>	5	6	supply voltage

## 7. Functional description

Table 4. Function table<sup>[1]</sup>

Input		Output
OE	A	Y
L	L	H
L	H	L
H	X	Z

- [1] H = HIGH voltage level;  
L = LOW voltage level;  
X = Don't care;  
Z = high-impedance OFF-state.

## 8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		-0.5	+4.6	V
$I_{IK}$	input clamping current	$V_I < 0$ V	-50	-	mA
$V_I$	input voltage		[1] -0.5	+4.6	V
$I_{OK}$	output clamping current	$V_O < 0$ V	-50	-	mA
$V_O$	output voltage	Active mode and Power-down mode	[1] -0.5	+4.6	V
$I_O$	output current	$V_O = 0$ V to $V_{CC}$	-	±20	mA
$I_{CC}$	supply current		-	50	mA
$I_{GND}$	ground current		-50	-	mA
$T_{stg}$	storage temperature		-65	+150	°C
$P_{tot}$	total power dissipation	$T_{amb} = -40$ °C to +125 °C	[2] -	250	mW

- [1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
[2] For TSSOP5 packages: above 87.5 °C the value of  $P_{tot}$  derates linearly with 4.0 mW/K.  
For XSON6 and X2SON5 packages: above 118 °C the value of  $P_{tot}$  derates linearly with 7.8 mW/K.

## 9. Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		0.8	3.6	V
$V_I$	input voltage		0	3.6	V
$V_O$	output voltage	Active mode	0	$V_{CC}$	V
		Power-down mode; $V_{CC} = 0$ V	0	3.6	V
$T_{amb}$	ambient temperature		-40	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 0.8$ V to 3.6 V	0	200	ns/V

## 10. Static characteristics

**Table 7. Static characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<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
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.6	-	-	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>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.44	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
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.1	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

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

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$\Delta I_{CC}$	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	$\mu\text{A}$
		$\overline{OE}$ 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; $V_I = \text{GND to } 3.6\text{ V}$ ; $\overline{OE} = V_{CC}$ ; $V_{CC} = 0.8\text{ V to } 3.6\text{ V}$	[2]	-	-	1	$\mu\text{A}$
$C_I$	input capacitance	$V_{CC} = 0\text{ V to } 3.6\text{ V}$ ; $V_I = \text{GND or } V_{CC}$	-	0.8	-	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_{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	$V_I = V_{IH}\text{ or } V_{IL}$					
		$I_O = -20\text{ }\mu\text{A}$ ; $V_{CC} = 0.8\text{ V to } 3.6\text{ V}$	$V_{CC} - 0.1$	-	-	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	$V_I = V_{IH}\text{ or } V_{IL}$					
		$I_O = 20\text{ }\mu\text{A}$ ; $V_{CC} = 0.8\text{ V to } 3.6\text{ V}$	-	-	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	
$I_I$	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	$V_I\text{ or } V_O = 0\text{ V to } 3.6\text{ V}$ ; $V_{CC} = 0\text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$	

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

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta I_{OFF}$	additional power-off leakage current	$V_I$ or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V	-	-	$\pm 0.6$	$\mu$ A
$I_{CC}$	supply current	$V_I =$ GND or $V_{CC}$ ; $I_O = 0$ A; $V_{CC} = 0.8$ V to 3.6 V	-	-	0.9	$\mu$ A
$\Delta I_{CC}$	additional supply current	data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	50	$\mu$ A
		$\overline{OE}$ input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	120	$\mu$ A
		all inputs; $V_I =$ GND to 3.6 V; $\overline{OE} = V_{CC}$ ; $V_{CC} = 0.8$ V to 3.6 V	[2]	-	1	$\mu$ A
<b><math>T_{amb} = -40</math> °C to <math>+125</math> °C</b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8$ V	$0.75 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9$ V to 1.95 V	$0.70 \times V_{CC}$	-	-	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	-	-	$0.25 \times V_{CC}$	V
		$V_{CC} = 0.9$ V to 1.95 V	-	-	$0.30 \times V_{CC}$	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	$V_{CC} - 0.11$	-	-	V
		$I_O = -1.1$ mA; $V_{CC} = 1.1$ V	$0.6 \times V_{CC}$	-	-	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
$V_{OL}$	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	-	-	0.11	V
		$I_O = 1.1$ mA; $V_{CC} = 1.1$ V	-	-	$0.33 \times V_{CC}$	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
$I_I$	input leakage current	$V_I =$ GND to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	$\pm 0.75$	$\mu$ A
		$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	$\pm 0.75$	$\mu$ A
$I_{OFF}$	power-off leakage current	$V_I$ or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	$\pm 0.75$	$\mu$ A

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

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta I_{OFF}$	additional power-off leakage current	$V_I$ or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V	-	-	$\pm 0.75$	$\mu A$
$I_{CC}$	supply current	$V_I = GND$ or $V_{CC}$ ; $I_O = 0$ A; $V_{CC} = 0.8$ V to 3.6 V	-	-	1.4	$\mu A$
$\Delta I_{CC}$	additional supply current	data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	75	$\mu A$
		$\overline{OE}$ input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	180	$\mu A$
		all inputs; $V_I = GND$ to 3.6 V; $\overline{OE} = V_{CC}$ ; $V_{CC} = 0.8$ V to 3.6 V	[2]	-	1	$\mu A$

[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 [Figure 10](#)

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	

$C_L = 5$  pF

$t_{pd}$	propagation delay	A to Y; see <a href="#">Figure 8</a> [2]							
		$V_{CC} = 0.8$ V	-	22.3	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	3.0	5.8	12.6	2.8	14.1	15.5	ns
		$V_{CC} = 1.4$ V to 1.6 V	2.3	4.0	7.3	2.1	8.5	9.5	ns
		$V_{CC} = 1.65$ V to 1.95 V	2.0	3.2	5.5	1.9	6.7	7.4	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.8	2.6	4.1	1.5	4.8	5.3	ns
$t_{en}$	enable time	$\overline{OE}$ to Y; see <a href="#">Figure 9</a> [3]							
		$V_{CC} = 0.8$ V	-	70.2	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	3.1	6.4	14.3	2.8	15.9	17.5	ns
		$V_{CC} = 1.4$ V to 1.6 V	2.5	4.4	8.1	2.2	9.5	10.5	ns
		$V_{CC} = 1.65$ V to 1.95 V	2.1	3.6	6.2	1.9	7.4	8.2	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.8	2.8	4.6	1.7	5.4	6.0	ns
$t_{dis}$	disable time	$\overline{OE}$ to Y; see <a href="#">Figure 9</a> [4]							
		$V_{CC} = 0.8$ V	-	14.8	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	2.0	4.3	7.4	2.3	8.3	9.2	ns
		$V_{CC} = 1.4$ V to 1.6 V	1.6	3.2	5.2	1.7	5.9	6.5	ns
		$V_{CC} = 1.65$ V to 1.95 V	1.5	3.0	4.8	1.5	5.5	6.1	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.1	2.2	3.5	1.4	4.0	4.5	ns
		$V_{CC} = 3.0$ V to 3.6 V	1.3	2.5	3.9	1.4	4.5	5.0	ns



**Table 8. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

Symbol	Parameter	Conditions	25 °C			–40 °C to +125 °C			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
<b>C<sub>L</sub> = 10 pF</b>									
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 8</a>	<a href="#">[2]</a>						
		V <sub>CC</sub> = 0.8 V	-	25.7	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.5	6.6	14.5	3.2	16.3	18.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.6	8.4	2.0	9.9	10.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	3.8	6.4	1.8	7.7	8.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.8	3.1	4.8	1.7	5.7	6.4	ns
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 9</a>	<a href="#">[3]</a>						
		V <sub>CC</sub> = 0.8 V	-	74.0	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.6	7.4	16.3	3.2	18.2	20.1	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.3	5.1	9.2	2.1	10.9	12.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	4.1	7.1	1.8	8.5	9.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.8	3.4	5.4	1.7	6.4	7.1	ns
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 9</a>	<a href="#">[4]</a>						
		V <sub>CC</sub> = 0.8 V	-	33.7	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.4	5.4	9.0	3.2	10.0	11.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	4.1	6.3	2.1	7.1	7.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	4.2	6.3	1.8	7.1	7.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	3.0	4.6	1.7	5.2	5.7	ns
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 8</a>	<a href="#">[2]</a>						
		V <sub>CC</sub> = 0.8 V	-	29.0	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.9	7.4	16.3	3.6	18.4	20.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.1	9.4	2.5	11.1	12.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.2	4.2	7.2	2.1	8.7	9.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	3.5	5.4	1.9	6.5	7.2	ns
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 9</a>	<a href="#">[3]</a>						
		V <sub>CC</sub> = 0.8 V	-	77.8	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.0	8.2	18.2	3.6	20.4	22.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.6	10.3	2.5	12.2	13.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	4.6	7.9	2.1	9.5	10.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.9	6.0	2.0	7.2	7.9	ns
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 8</a>	<a href="#">[2]</a>						
		V <sub>CC</sub> = 0.8 V	-	29.0	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.9	7.4	16.3	3.6	18.4	20.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.1	9.4	2.5	11.1	12.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.2	4.2	7.2	2.1	8.7	9.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	3.5	5.4	1.9	6.5	7.2	ns
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 9</a>	<a href="#">[3]</a>						
		V <sub>CC</sub> = 0.8 V	-	77.8	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.0	8.2	18.2	3.6	20.4	22.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.6	10.3	2.5	12.2	13.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	4.6	7.9	2.1	9.5	10.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.9	6.0	2.0	7.2	7.9	ns

**Table 8. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

Symbol	Parameter	Conditions	25 °C			–40 °C to +125 °C			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 9</a> <sup>[4]</sup>							
		V <sub>CC</sub> = 0.8 V	-	62.5	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.3	6.6	10.4	3.6	11.6	12.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.0	7.4	2.5	8.4	9.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	5.3	7.8	2.1	8.7	9.7	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.8	5.7	2.0	6.4	7.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.9	5.0	7.4	1.9	8.3	9.1	ns
<b>C<sub>L</sub> = 30 pF</b>									
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>							
		V <sub>CC</sub> = 0.8 V	-	39.1	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	5.0	9.7	21.6	4.6	24.3	26.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	6.7	12.3	3.0	14.6	16.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.9	5.5	9.5	2.7	11.5	12.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.7	4.6	7.1	2.5	8.6	9.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.6	4.3	6.4	2.5	7.7	8.5	ns
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 9</a> <sup>[3]</sup>							
		V <sub>CC</sub> = 0.8 V	-	89.4	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	5.2	10.6	23.8	4.6	26.7	29.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	7.3	13.2	3.0	15.7	17.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	6.0	10.2	2.7	12.3	13.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.8	5.0	7.8	2.6	9.3	10.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.8	4.8	7.1	2.6	8.4	9.3	ns
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 9</a> <sup>[4]</sup>							
		V <sub>CC</sub> = 0.8 V	-	68.9	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	6.0	9.3	15.0	4.6	16.5	18.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.4	7.7	11.0	3.0	12.2	13.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	5.1	8.8	12.4	2.7	13.7	15.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	3.6	6.2	9.0	2.6	10.0	11.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	5.2	8.8	12.7	2.6	14.0	15.4	ns

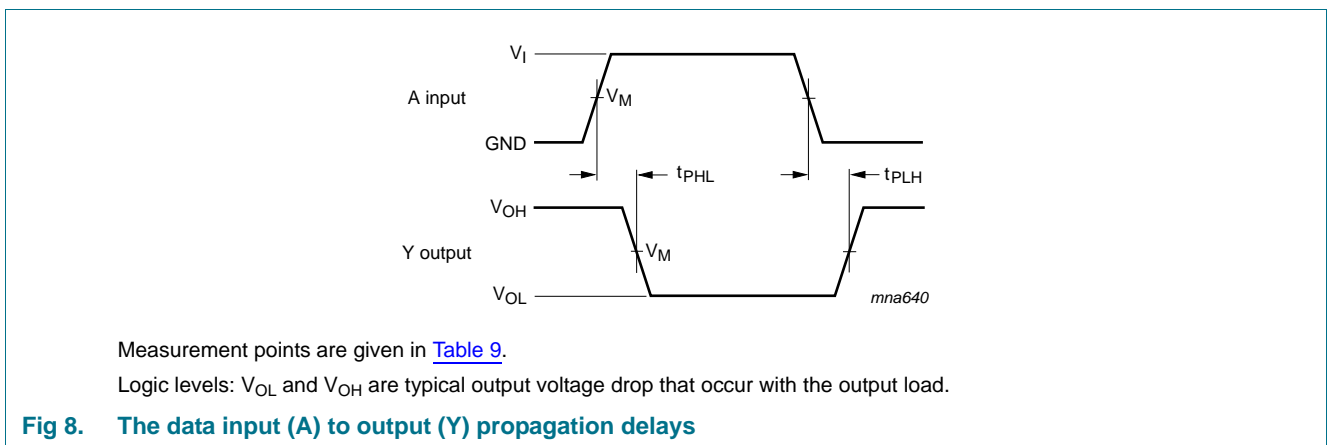
**Table 8. Dynamic characteristics ...continued**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#)

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
<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>		[5]					
		V <sub>CC</sub> = 0.8 V	-	2.7	-	-	-	-	pF
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	2.9	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	3.0	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	3.2	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.7	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.2	-	-	-	-	pF

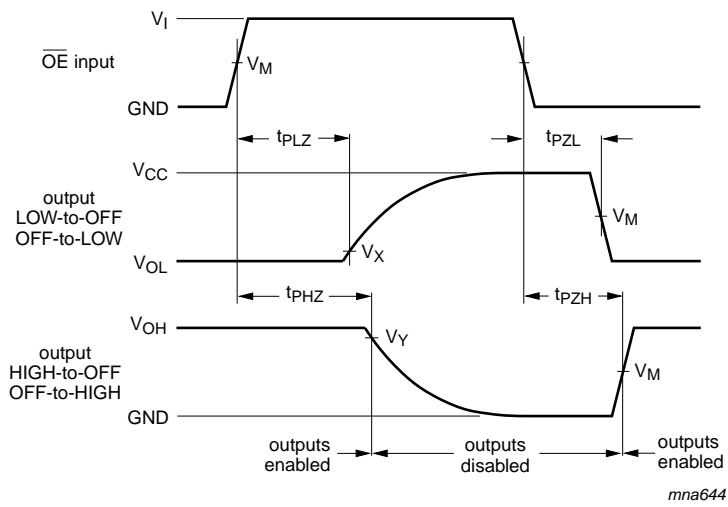
- [1] All typical values are measured at nominal V<sub>CC</sub>.
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>
- [3] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>
- [4] t<sub>dis</sub> is the same as t<sub>PHZ</sub> and t<sub>PLZ</sub>
- [5] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$  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;  
 $\sum(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

## 12. Waveforms



**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



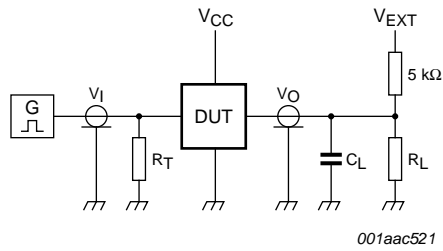
Measurement points are given in [Table 10](#).

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

**Fig 9. Enable and disable time**

**Table 10. Measurement points**

Supply voltage	Input	Output		
$V_{CC}$	$V_M$	$V_M$	$V_X$	$V_Y$
0.8 V to 1.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.1 V$	$V_{OH} - 0.1 V$
1.65 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15 V$	$V_{OH} - 0.15 V$
3.0 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$



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 10. 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  $R_L = 1 \text{ M}\Omega$ .

13. Package outline

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

SOT353-1

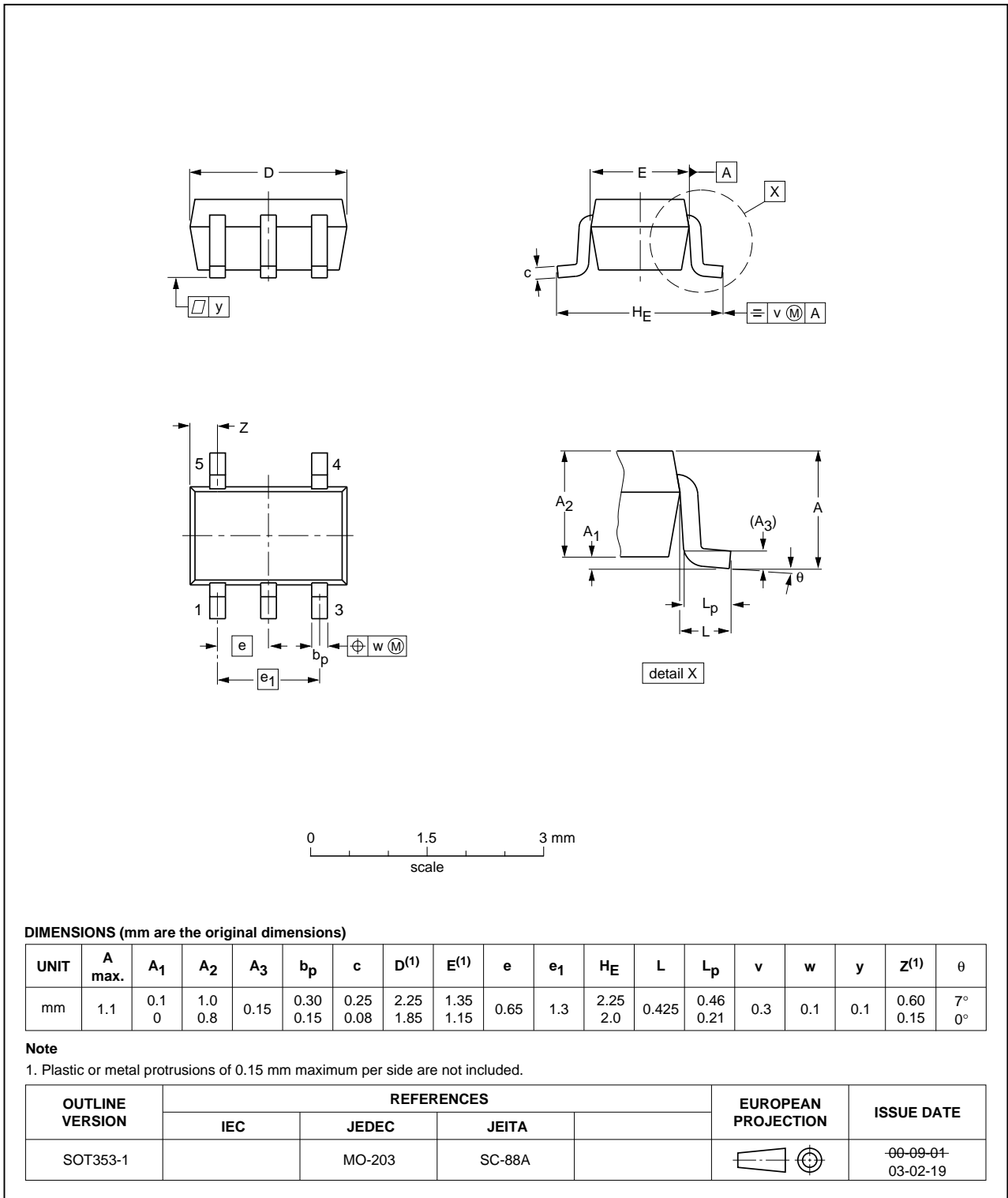


Fig 11. Package outline SOT353-1 (TSSOP5)

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

SOT886

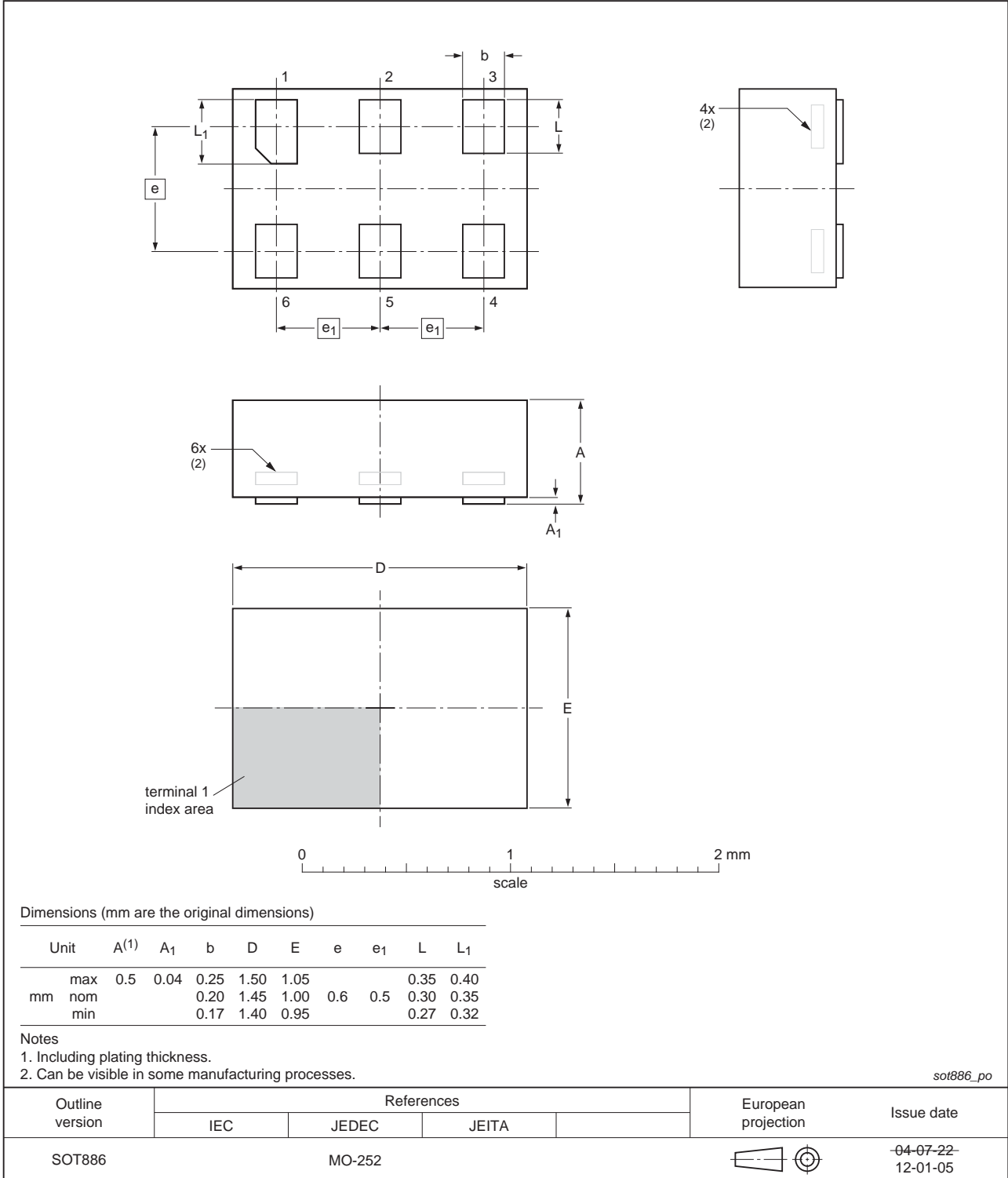


Fig 12. Package outline SOT886 (XSON6)

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

SOT891

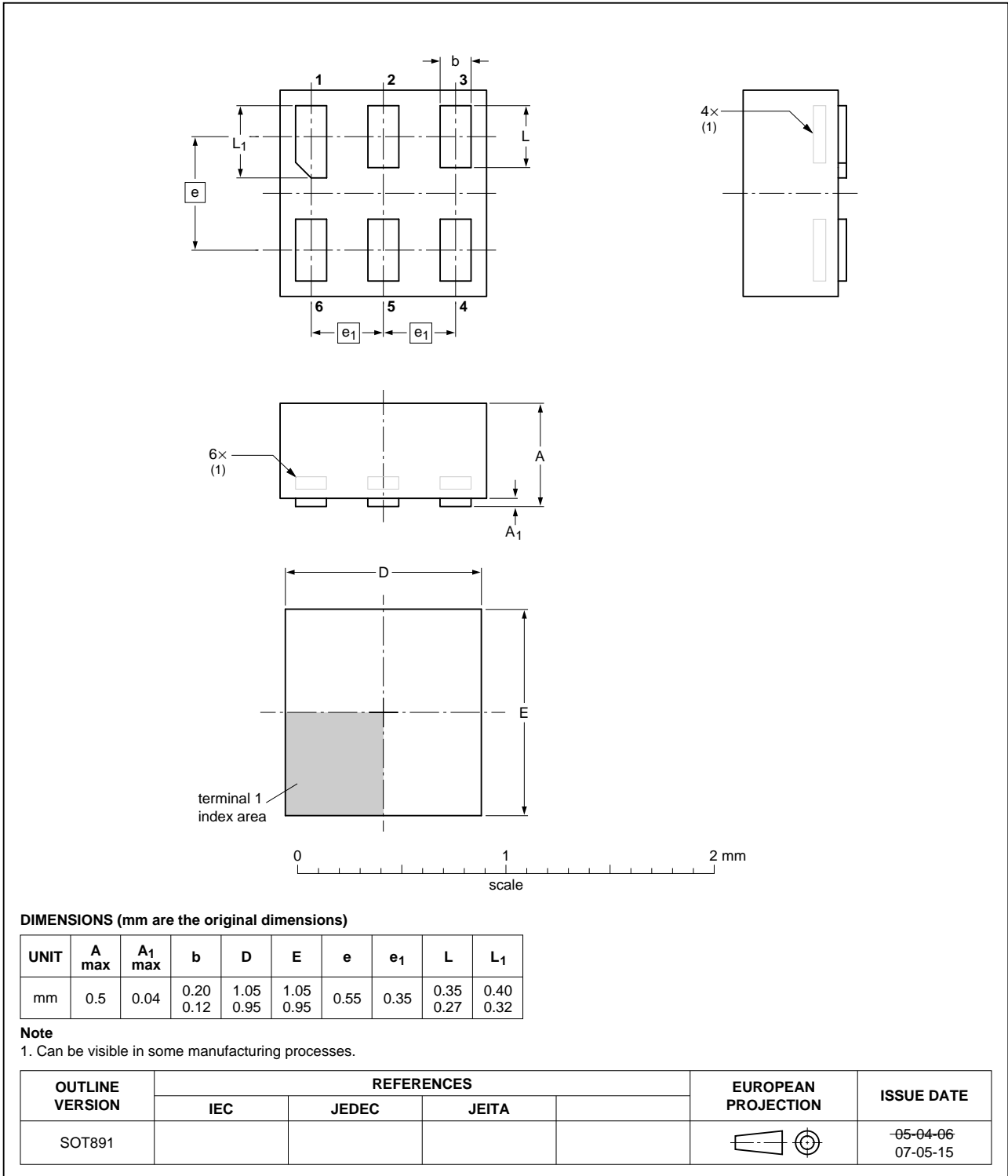


Fig 13. Package outline SOT891 (XSON6)



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

SOT1115

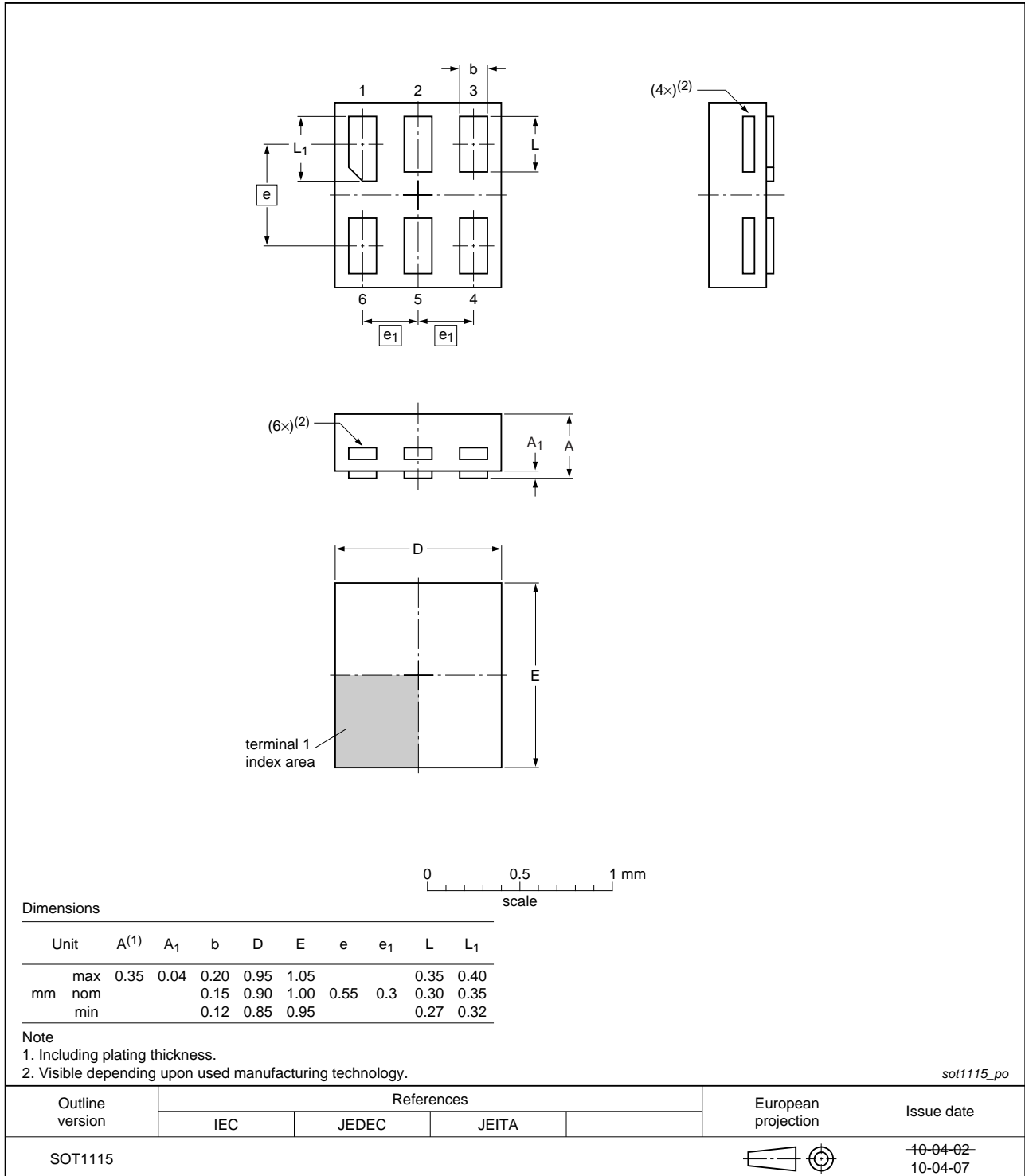
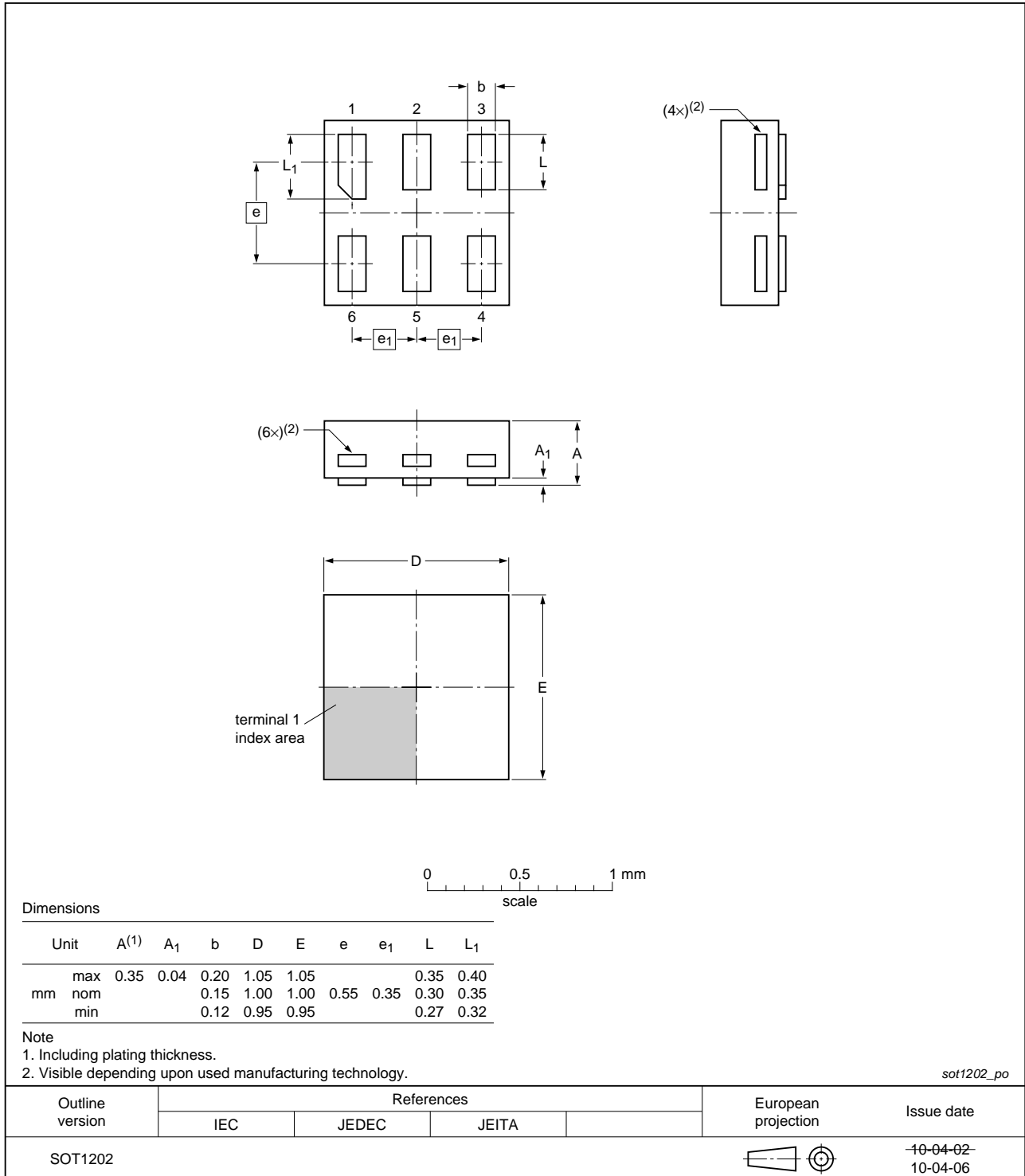


Fig 14. Package outline SOT1115 (XSON6)

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

**SOT1202**



**Fig 15. Package outline SOT1202 (XSON6)**

X2SON5: plastic thermal enhanced extremely thin small outline package; no leads;  
5 terminals; body 0.8 x 0.8 x 0.35 mm

SOT1226

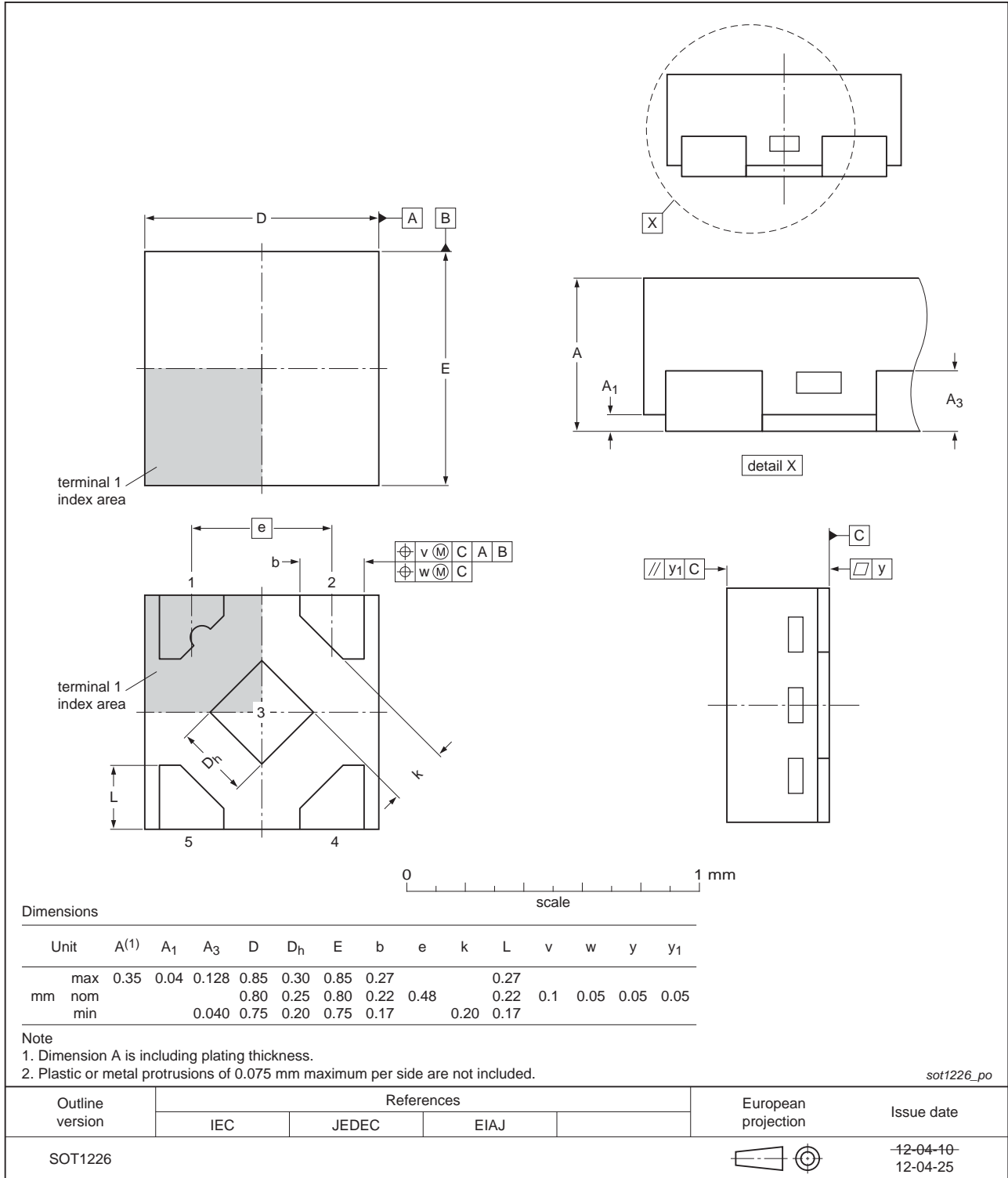


Fig 16. Package outline SOT1226 (X2SON5)

## 14. Abbreviations

Table 12. Abbreviations

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

## 15. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1G240 v.4	20120629	Product data sheet	-	74AUP1G240 v.3
Modifications:	<ul style="list-style-type: none"> <li>Added type number 74AUP1G240GX (SOT1226)</li> <li>Package outline drawing of SOT886 (<a href="#">Figure 12</a>) modified.</li> </ul>			
74AUP1G240 v.3	20111124	Product data sheet	-	74AUP1G240 v.2
Modifications:	<ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>			
74AUP1G240 v.2	20100913	Product data sheet	-	74AUP1G240 v.1
74AUP1G240 v.1	20061106	Product data sheet	-	-

## 16. Legal information

### 16.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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 URL <http://www.nxp.com>.

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