74AUP1G126 Low-power buffer/line driver; 3-state Rev. 7 — 16 May 2018

**Product data sheet** 

### **1** General description

The 74AUP1G126 provides a single non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input (OE). A LOW level at pin 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 OE is LOW.

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 a 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)
- 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;  $I_{CC} = 0.9 \ \mu A$  (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<sub>CC</sub>
- · Input-disable feature allows floating input conditions
- I<sub>OFF</sub> circuitry provides partial power-down mode operation
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

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# **3** Ordering information

Table 1. Ordering i	nformation							
Type number	Package	Package						
	Temperature range	Name	Description	Version				
74AUP1G126GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1				
74AUP1G126GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm	SOT886				
74AUP1G126GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm	SOT891				
74AUP1G126GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm	SOT1115				
74AUP1G126GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm	SOT1202				
74AUP1G126GX	-40 °C to +125 °C	X2SON5	plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm	SOT1226				

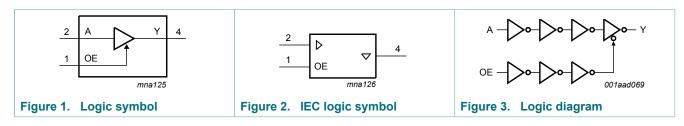
# 4 Marking

#### Table 2. Marking

Type number	Marking code <sup>[1]</sup>
74AUP1G126GW	pN
74AUP1G126GM	pN
74AUP1G126GF	pN
74AUP1G126GN	pN
74AUP1G126GS	pN
74AUP1G126GX	pN

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

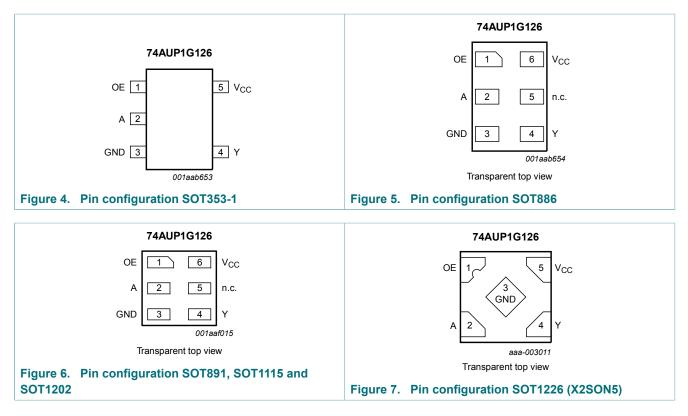
## 5 Functional diagram



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## **6 Pinning information**

### 6.1 Pinning



### 6.2 Pin description

Table 3. Pin description						
Symbol	Pin		Description			
	TSSOP5 and X2SON5	XSON6				
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			

#### **Functional description** 7

#### Table 4. Function table

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

Input		Output
OE	A	Y
н	L	L
Н	Н	Н
L	X	Z

#### **Limiting values** 8

#### 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
VI	input voltage	[1]	-0.5	+4.6	V
I <sub>OK</sub>	output clamping current	V <sub>0</sub> < 0 V	-50	-	mA
Vo	output voltage	Active mode <sup>[1]</sup>	-0.5	V <sub>CC</sub> + 0.5	V
		Power-down mode <sup>[1]</sup>	-0.5	+4.6	V
I <sub>O</sub>	output current	$V_{O}$ = 0 V to $V_{CC}$	-	±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 <sup>[2]</sup>	-	250	mW

For XSON6 and X2SON5 packages: above 118 °C the value of Ptot derates linearly with 7.8 mW/K.

#### **Recommended operating conditions** 9

#### Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	supply voltage		0.8	3.6	V
VI	input voltage		0	3.6	V
Vo	output voltage	Active mode	0	V <sub>CC</sub>	V
		Power-down mode; $V_{CC}$ = 0 V	0	3.6	V
T <sub>amb</sub>	ambient temperature		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	$V_{CC}$ = 0.8 V to 3.6 V	0	200	ns/V

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# **10 Static characteristics**

#### Table 7. Static characteristics

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

Symbol	Parameter	Conditions	Min	Тур	Мах	Unit
T <sub>amb</sub> = 2	5 °C					<u> </u>
VIH	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	-	-	$0.35 \times V_{CC}$	V
		$V_{CC}$ = 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	$V_{I} = V_{IH} \text{ or } V_{IL}$				
		$I_{O}$ = -20 µA; $V_{CC}$ = 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
		$I_{\rm O}$ = -2.3 mA; $V_{\rm CC}$ = 2.3 V	2.05	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.9	-	-	V
		$I_{O}$ = -2.7 mA; $V_{CC}$ = 3.0 V	2.72	-	-	V
		$I_{O}$ = -4.0 mA; $V_{CC}$ = 3.0 V	2.6	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_{I} = V_{IH} \text{ or } V_{IL}$				
		$I_{O}$ = 20 µA; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	$0.3 \times V_{CC}$	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
		$I_{\rm O}$ = 2.3 mA; $V_{\rm CC}$ = 2.3 V	-	-	0.31	V
		$I_{\rm O}$ = 3.1 mA; $V_{\rm CC}$ = 2.3 V	-	-	0.44	V
		$I_{\rm O}$ = 2.7 mA; $V_{\rm CC}$ = 3.0 V	-	-	0.31	V
		$I_{\rm O}$ = 4.0 mA; $V_{\rm CC}$ = 3.0 V	-	-	0.44	V
I	input leakage current	$V_{\rm I}$ = GND to 3.6 V; $V_{\rm CC}$ = 0 V to 3.6 V	-	-	±0.1	μA
l <sub>oz</sub>	OFF-state output current	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{O} = 0 \text{ V to } 3.6 \text{ V};$ $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	±0.1	μA
IOFF	power-off leakage current	$V_{I}$ or $V_{O}$ = 0 V to 3.6 V; $V_{CC}$ = 0 V	-	-	±0.2	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	$V_1$ or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V	-	-	±0.2	μA

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

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
I <sub>CC</sub>	supply current	$V_{I} = GND \text{ or } V_{CC}; I_{O} = 0 \text{ A};$ $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$		-	-	0.5	μA
ΔI <sub>CC</sub>	additional supply current	data input; 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
		OE input; 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]	-	-	110	μA
		all inputs; V <sub>I</sub> = GND to 3.6 V; OE = GND; V <sub>CC</sub> = 0.8 V to 3.6 V	[2]	-	-	1	μA
CI	input capacitance	$V_{CC}$ = 0 V to 3.6 V; $V_{I}$ = GND or $V_{CC}$		-	0.9	-	pF
Co	output capacitance	output enabled; $V_0$ = GND; $V_{CC}$ = 0 V		-	1.7	-	pF
		output disabled; V <sub>CC</sub> = 0 V to 3.6 V; V <sub>O</sub> = GND or V <sub>CC</sub>		-	1.5	-	pF
T <sub>amb</sub> = -4	40 °C to +85 °C						
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
		$V_{CC}$ = 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		-	-	$0.30 \times V_{CC}$	V
		V <sub>CC</sub> = 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 <sub>CC</sub> = 3.0 V to 3.6 V		-	-	0.9	V
V <sub>OH</sub>	HIGH-level output voltage	$V_{I} = V_{IH} \text{ or } V_{IL}$					
		$I_{\rm O}$ = -20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V	٧	/ <sub>CC</sub> - 0.1	-	-	V
		$I_{O}$ = -1.1 mA; $V_{CC}$ = 1.1 V	0	.7 × V <sub>CC</sub>	-	-	V
		$I_{\rm O}$ = -1.7 mA; $V_{\rm CC}$ = 1.4 V		1.03	-	-	V
		$I_{\rm O}$ = -1.9 mA; $V_{\rm CC}$ = 1.65 V		1.30	-	-	V
		$I_{\rm O}$ = -2.3 mA; $V_{\rm CC}$ = 2.3 V		1.97	-	-	V
		$I_{\rm O}$ = -3.1 mA; $V_{\rm CC}$ = 2.3 V		1.85	-	-	V
		$I_{\rm O}$ = -2.7 mA; $V_{\rm CC}$ = 3.0 V		2.67	-	-	V
		$I_{\rm O}$ = -4.0 mA; $V_{\rm CC}$ = 3.0 V		2.55	-	-	V

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

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V <sub>OL</sub>	LOW-level output voltage	$V_{I} = V_{IH} \text{ or } V_{IL}$					
		$I_{O}$ = 20 µA; $V_{CC}$ = 0.8 V to 3.6 V		_	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V		-	-	$0.3 \times V_{CC}$	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
		$I_{\rm O}$ = 2.3 mA; $V_{\rm CC}$ = 2.3 V		-	-	0.33	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V		-	-	0.45	V
		$I_{\rm O}$ = 2.7 mA; $V_{\rm CC}$ = 3.0 V		-	-	0.33	V
		$I_{\rm O}$ = 4.0 mA; $V_{\rm CC}$ = 3.0 V		-	-	0.45	V
l <sub>l</sub>	input leakage current	$V_{\rm I}$ = GND to 3.6 V; $V_{\rm CC}$ = 0 V to 3.6 V		-	-	±0.5	μA
I <sub>OZ</sub>	OFF-state output current	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{O} = 0 \text{ V to } 3.6 \text{ V};$ $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$		-	-	±0.5	μA
I <sub>OFF</sub>	power-off leakage current	$V_{I}$ or $V_{O}$ = 0 V to 3.6 V; $V_{CC}$ = 0 V		-	-	±0.5	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	$V_{I} \text{ or } V_{O} = 0 \text{ V to } 3.6 \text{ V;}$ $V_{CC} = 0 \text{ V to } 0.2 \text{ V}$		-	-	±0.6	μA
I <sub>CC</sub>	supply current	$V_{I} = GND \text{ or } V_{CC}; I_{O} = 0 \text{ A};$ $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$		-	-	0.9	μA
ΔI <sub>CC</sub>	additional supply current	data input; 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
		OE input; 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]	-	-	120	μA
		all inputs; V <sub>I</sub> = GND to 3.6 V; OE = GND; V <sub>CC</sub> = 0.8 V to 3.6 V	[2]	-	-	1	μA
T <sub>amb</sub> = -4	10 °C to +125 °C			· · · · · ·			
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		-	-	$0.25 \times V_{CC}$	V
		V <sub>CC</sub> = 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 <sub>CC</sub> = 3.0 V to 3.6 V		-	-	0.9	V

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V <sub>OH</sub>	HIGH-level output voltage	$V_{I} = V_{IH} \text{ or } V_{IL}$				
		$I_{\rm O}$ = -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	$0.6 \times V_{CC}$	-	-	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
		$I_{\rm O}$ = -2.3 mA; $V_{\rm CC}$ = 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
		$I_{\rm O}$ = -4.0 mA; $V_{\rm CC}$ = 3.0 V	2.30	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_{I} = V_{IH} \text{ or } V_{IL}$				
		$I_{O}$ = 20 µA; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.11	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	$0.33 \times V_{CC}$	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
		$I_{\rm O}$ = 2.3 mA; $V_{\rm CC}$ = 2.3 V	-	-	0.36	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.50	V
		$I_{\rm O}$ = 2.7 mA; $V_{\rm CC}$ = 3.0 V	-	-	0.36	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.50	V
l <sub>l</sub>	input leakage current	$V_{I}$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V	-	-	±0.75	μA
I <sub>OZ</sub>	OFF-state output current	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{O} = 0 \text{ V to } 3.6 \text{ V};$ $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	±0.75	μA
I <sub>OFF</sub>	power-off leakage current	$V_{I}$ or $V_{O}$ = 0 V to 3.6 V; $V_{CC}$ = 0 V	-	-	±0.75	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	$V_1 \text{ or } V_0 = 0 \text{ V to } 3.6 \text{ V};$ $V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	±0.75	μA
I <sub>CC</sub>	supply current	$V_{I} = GND \text{ or } V_{CC}; I_{O} = 0 \text{ A};$ $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	1.4	μA
ΔI <sub>CC</sub>	additional supply current	data input; 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
		OE input; $V_I = V_{CC} - 0.6 \text{ V}$ ; $I_O = 0 \text{ A}$ ; $V_{CC} = 3.3 \text{ V}$	[1] _	-	180	μA
		all inputs; V <sub>I</sub> = GND to 3.6 V; OE = GND; V <sub>CC</sub> = 0.8 V to 3.6 V	[2] _	-	1	μA

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# **11** Dynamic characteristics

#### Table 8. Dynamic characteristics

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

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
T <sub>amb</sub> = 25	°C; C <sub>L</sub> = 5 pF					
t <sub>pd</sub>	propagation delay	A to Y; see Figure 8 [2]				
		V <sub>CC</sub> = 0.8 V	-	20.6	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.8	5.5	10.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	3.9	6.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	3.2	4.8	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.6	2.6	3.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.4	2.4	3.1	ns
en	enable time	OE to Y; see Figure 9 <sup>[3]</sup>				
		V <sub>CC</sub> = 0.8 V	-	71.6	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.8	6.2	12.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.3	4.2	6.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	3.3	5.3	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.5	2.4	3.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	2.0	2.9	ns
dis	disable time	OE to Y; see Figure 9 [4]				
		V <sub>CC</sub> = 0.8 V	-	10.3	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.6	4.2	6.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	3.2	4.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	3.1	4.4	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.7	2.4	3.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.1	2.8	3.6	ns
T <sub>amb</sub> = 25	°C; C <sub>L</sub> = 10 pF					
pd	propagation delay	see <u>Figure 8</u> <sup>[2]</sup>				
		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	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	4.5	7.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	3.8	5.5	ns
		$V_{CC}$ = 2.3 V to 2.7 V	2.1	3.2	4.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.8	3.0	3.8	ns

# 74AUP1G126

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

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
t <sub>en</sub>	enable time	see <u>Figure 9</u> <sup>[3]</sup>				
		V <sub>CC</sub> = 0.8 V	-	75.3	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.2	7.1	14.1	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.8	8.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.8	3.9	5.9	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.5	2.9	4.2	ns
		$V_{CC}$ = 3.0 V to 3.6 V	1.4	2.6	3.6	ns
t <sub>dis</sub>	disable time	see <u>Figure 9</u> <sup>[4]</sup>				
		$V_{CC} = 0.8 V$	-	12.2	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.5	5.3	7.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.1	5.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.4	4.2	5.7	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.9	3.2	4.1	ns
		$V_{CC}$ = 3.0 V to 3.6 V	2.4	4.1	5.0	ns
T <sub>amb</sub> = 25	°C; C <sub>L</sub> = 15 pF			-		
t <sub>pd</sub>	propagation delay	see <u>Figure 8</u> <sup>[2]</sup>				
		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	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.1	8.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.2	4.3	6.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	3.7	4.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.5	4.4	ns
t <sub>en</sub>	enable time	see <u>Figure 9</u> <sup>[3]</sup>				
		V <sub>CC</sub> = 0.8 V	-	79.2	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.6	7.8	15.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.4	8.8	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	4.3	6.7	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.8	3.4	4.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.6	3.1	4.3	ns
				1		

# 74AUP1G126

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

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
t <sub>dis</sub>	disable time	see <u>Figure 9</u> <sup>[4]</sup>				
		V <sub>CC</sub> = 0.8 V	-	14.9	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.3	6.4	8.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.0	6.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.1	5.4	6.6	ns
		$V_{CC}$ = 2.3 V to 2.7 V	2.4	4.0	5.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	3.2	5.3	6.2	ns
T <sub>amb</sub> = 25	°C; C <sub>L</sub> = 30 pF					
t <sub>pd</sub>	propagation delay	see <u>Figure 8</u> <sup>[2]</sup>				
		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	18.7	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	6.7	10.8	ns
		$V_{\rm CC}$ = 1.65 V to 1.95 V	2.9	5.6	8.4	ns
		$V_{CC}$ = 2.3 V to 2.7 V	2.7	4.8	6.3	ns
		$V_{CC}$ = 3.0 V to 3.6 V	2.7	4.6	5.8	ns
t <sub>en</sub>	enable time	see <u>Figure 9</u> <sup>[3]</sup>				
		V <sub>CC</sub> = 0.8 V	-	90.6	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.7	10.0	20.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	6.9	11.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.6	5.6	8.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.3	4.5	6.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.2	4.2	5.8	ns
t <sub>dis</sub>	disable time	see <u>Figure 9</u> <sup>[4]</sup>				
		V <sub>CC</sub> = 0.8 V	-	51.6	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	6.0	9.8	13.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.5	7.7	10.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	5.2	8.8	11.4	ns
		$V_{CC}$ = 2.3 V to 2.7 V	3.9	6.4	7.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	5.5	9.0	10.7	ns

# 74AUP1G126

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

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Мах	Unit
T <sub>amb</sub> = 25	°C	·			1	
C <sub>PD</sub> p	power dissipation capacitance	$f = 1 \text{ MHz}; V_I = \text{GND to } V_{CC}$	5]			
		output enabled				
		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  $V_{CC}$ .

[2]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ . [3]  $t_{en}$  is the same as  $t_{PZH}$  and  $t_{PZL}$ .

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

 $f_i$  = input frequency in MHz;

 $f_o$  = output frequency in MHz;

C<sub>L</sub> = output load capacitance in pF;

 $V_{CC}$  = supply voltage in V;

N = number of inputs switching;

 $\Sigma(C_L \times V_{CC}^2 \times f_0)$  = sum of the outputs.

#### Table 9. Dynamic characteristics

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

Symbol	Parameter	Conditions	-40 °C t	o +85 °C	-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
C <sub>L</sub> = 5 pl	F				1	1	
t <sub>pd</sub>	propagation delay	A to Y; see Figure 8 [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.5	11.7	2.5	12.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.0	7.3	2.0	8.1	ns
	V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	6.1	1.7	6.7	ns	
		$V_{CC}$ = 2.3 V to 2.7 V	1.4	4.3	1.4	4.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.2	3.9	1.2	4.4	ns
t <sub>en</sub>	enable time	OE to Y; see Figure 9 <sup>[2]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.6	13.6	2.6	13.6	ns
		$V_{CC}$ = 1.4 V to 1.6 V	2.2	7.4	2.2	7.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	5.9	1.7	6.2	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.4	3.8	1.4	4.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.2	3.2	1.2	3.4	ns

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

Symbol	Parameter	Conditions	-40 °C t	o +85 °C	-40 °C to	+125 °C	Unit
			Min	Мах	Min	Мах	
t <sub>dis</sub>	disable time	OE to Y; see Figure 9 [3]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.9	6.4	2.9	6.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.6	2.2	4.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	4.6	1.7	4.8	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.4	3.4	1.4	3.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.2	3.7	1.2	3.8	ns
C <sub>L</sub> = 10 p	р <b>F</b>			1	1	1	
t <sub>pd</sub>	propagation delay	A to Y; see <u>Figure 8</u> <sup>[1]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.0	13.8	3.0	15.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.9	8.5	1.9	9.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	6.8	1.7	7.6	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.6	5.3	1.6	5.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.6	4.6	1.6	5.2	ns
t <sub>en</sub>	enable time	OE to Y; see Figure 9 <sup>[2]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.0	15.4	3.0	15.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	8.3	2.1	8.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	6.5	1.7	6.8	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.4	4.5	1.4	4.8	ns
		$V_{CC}$ = 3.0 V to 3.6 V	1.3	3.8	1.3	4.0	ns
t <sub>dis</sub>	disable time	OE to Y; see Figure 9 <sup>[3]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.3	7.9	3.3	7.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	5.7	2.1	5.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	5.8	1.7	6.0	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.4	4.3	1.4	4.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	5.2	1.3	5.3	ns

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

Symbol	Parameter	Conditions	-40 °C t	o +85 °C	-40 °C to	o +125 °C	Unit
			Min	Мах	Min	Max	
C <sub>L</sub> = 15 p	ρF					1	
t <sub>pd</sub>	propagation delay	A to Y; see Figure 8	[1]				
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.3	15.8	3.3	17.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.5	9.8	2.5	10.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	7.9	2.0	8.8	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.8	6.0	1.8	6.7	ns
		$V_{CC}$ = 3.0 V to 3.6 V	1.8	5.4	1.8	6.1	ns
en	enable time	OE to Y; see Figure 9	[2]				
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.3	17.1	3.3	17.1	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.9	9.4	2.9	9.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	7.3	2.0	7.7	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.7	5.2	1.7	5.6	ns
		$V_{CC}$ = 3.0 V to 3.6 V	1.5	4.5	1.5	4.7	ns
t <sub>dis</sub>	disable time	OE to Y; see Figure 9	[3]				
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.7	9.3	3.7	9.4	ns
		$V_{CC}$ = 1.4 V to 1.6 V	2.5	6.9	2.5	7.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	7.4	2.0	7.5	ns
		$V_{CC}$ = 2.3 V to 2.7 V	1.7	5.1	1.7	5.5	ns
		$V_{CC}$ = 3.0 V to 3.6 V	1.5	6.7	1.5	6.9	ns

## Nexperia

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

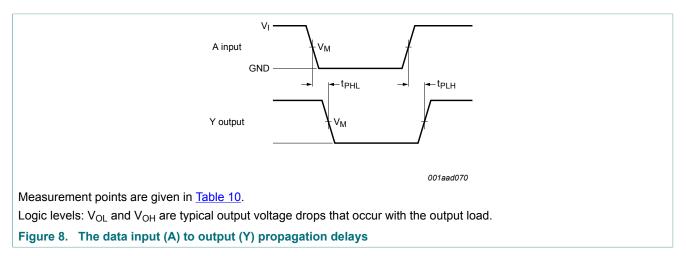
Symbol	Parameter	Conditions	-40 °C t	o +85 °C	-40 °C to	o +125 °C	Unit
			Min	Мах	Min	Max	
C <sub>L</sub> = 30 p	oF					1	
t <sub>pd</sub>	propagation delay	A to Y; see <u>Figure 8</u> <sup>[1]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.4	21.4	4.4	24.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	13.0	3.0	14.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.6	10.3	2.6	11.5	ns
		$V_{CC}$ = 2.3 V to 2.7 V	2.5	7.8	2.5	8.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.5	7.0	2.5	8.3	ns
en	enable time	OE to Y; see Figure 9 [2]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.3	22.0	4.3	22.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.7	12.0	3.7	12.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.2	9.5	3.2	10.1	ns
		$V_{CC}$ = 2.3 V to 2.7 V	2.9	6.8	2.9	7.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	6.4	2.7	6.7	ns
t <sub>dis</sub>	disable time	OE to Y; see <u>Figure 9</u> <sup>[3]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.7	14.3	4.7	14.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	10.7	3.0	11.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.6	11.5	2.6	11.6	ns
		$V_{CC}$ = 2.3 V to 2.7 V	2.3	9.0	2.3	10.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.2	10.8	2.2	12.0	ns

Nexperia

 $\begin{array}{ll} [1] & t_{pd} \text{ is the same as } t_{PLH} \text{ and } t_{PHL}. \\ [2] & t_{en} \text{ is the same as } t_{PZH} \text{ and } t_{PZL}. \\ [3] & t_{dis} \text{ is the same as } t_{PHZ} \text{ and } t_{PLZ}. \end{array}$ 

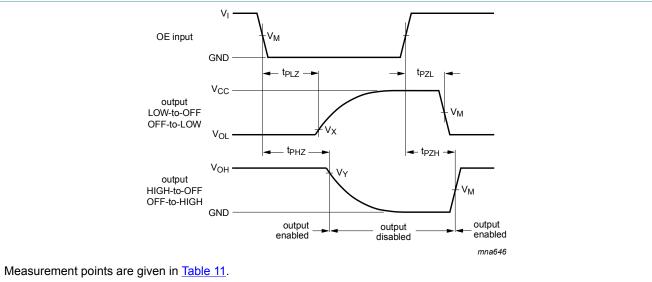
Low-power buffer/line driver; 3-state

### 11.1 Waveforms and test circuit



#### Table 10. Measurement points

Supply voltage	Output	Input					
V <sub>cc</sub>	V <sub>M</sub>	V <sub>M</sub>	VI	t <sub>r</sub> = t <sub>f</sub>			
0.8 V to 3.6 V	0.5 x V <sub>CC</sub>	0.5 x V <sub>CC</sub>	V <sub>CC</sub>	≤ 3.0 ns			



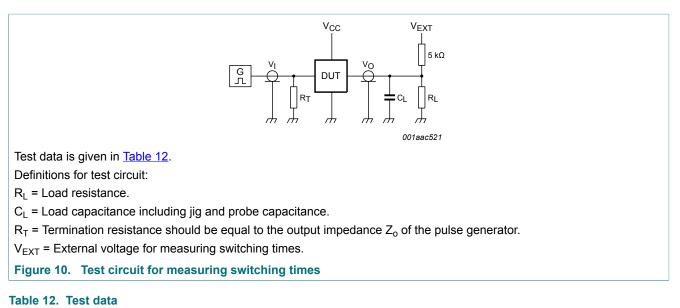
Logic levels:  $V_{OL}$  and  $V_{OH}$  are typical output voltage drops that occur with the output load.

#### Figure 9. Enable and disable times

Supply voltage	Input	Output		
V <sub>cc</sub>	V <sub>M</sub>	V <sub>M</sub>	V <sub>X</sub>	V <sub>Y</sub>
0.8 V to 1.6 V	0.5 x V <sub>CC</sub>	0.5 x V <sub>CC</sub>	V <sub>OL</sub> + 0.1 V	V <sub>OH</sub> - 0.1 V
1.65 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V <sub>OL</sub> + 0.15 V	V <sub>OH</sub> - 0.15 V
3.0 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> - 0.3 V

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



Supply voltage	Load	V <sub>EXT</sub>			
V <sub>cc</sub>	CL	R <sub>L</sub> <sup>[1]</sup>	t <sub>PLH</sub> , t <sub>PHL</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	t <sub>PZL</sub> , t <sub>PLZ</sub>
0.8 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	5 k $\Omega$ or 1 M $\Omega$	open	GND	$2 \times V_{CC}$

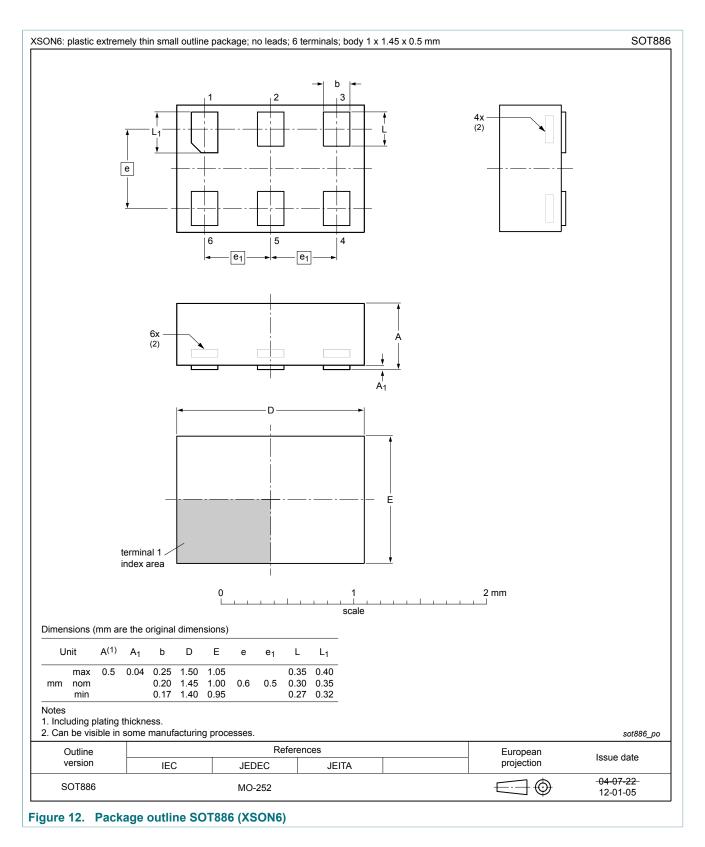
[1] For measuring enable and disable times  $R_L = 5 k\Omega$ , for measuring propagation delays, setup and hold times and pulse width  $R_L = 1 M\Omega$ .

Low-power buffer/line driver; 3-state

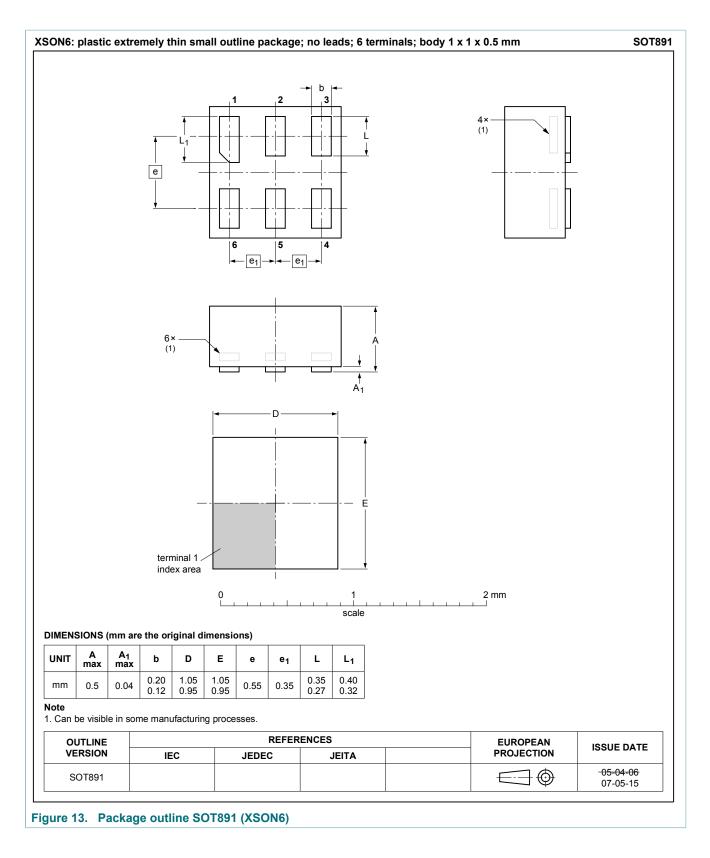
# 12 Package outline

	: plas	tic th	in shr	ink sr	nall o	utline	packa	age; 5	i leads	s; boc	ly wid	th 1.2	5 mm	l			SC	DT353
		Ĩ	y						с	↓ ↓				X	(M) A			
		-		- Z	[] 	4  3 ← ⊕ w v	(				A <sub>1</sub> ↓	detail	L <sub>p</sub> L <sub>p</sub>	(A <sub>3</sub> ) ↓ ↓	Α             			
		m ara	the crite	inal dia			1.5  sca		1	3 mm _⊣								
DIMENS	IONS (n A max	ım are A <sub>1</sub>	the orig	inal din	L	s)			e	3 mm	HE	L	Lp	v	w	У	Z <sup>(1)</sup>	θ
					nension bp 0.30	<b>c</b> 0.25	sca D(1) 2.25	E(1)	<b>e</b> 0.65		2.25	L 0.425	0.46	<b>v</b> 0.3	<b>w</b> 0.1	<b>y</b> 0.1	0.60	θ 7° 0°
UNIT mm lote	A max. 1.1	<b>A<sub>1</sub></b> 0.1 0	<b>A<sub>2</sub></b> 1.0 0.8	<b>A</b> <sub>3</sub> 0.15	<b>b</b> p 0.30 0.15	<b>c</b> 0.25 0.08	sca D(1) 2.25 1.85	E(1) 1.35 1.15	0.65	e1								7°
UNIT mm lote . Plastic	A max. 1.1 c or meta	<b>A<sub>1</sub></b> 0.1 0	<b>A<sub>2</sub></b> 1.0 0.8	<b>A</b> <sub>3</sub> 0.15	<b>b</b> p 0.30 0.15	c 0.25 0.08 num per s	sca D(1) 2.25 1.85 side are	E(1) 1.35 1.15	0.65 Iuded.	e1	2.25		0.46 0.21	0.3 EUROI	0.1 PEAN	0.1	0.60 0.15	7° 0°
UNIT mm lote . Plastic VE	A max. 1.1	<b>A<sub>1</sub></b> 0.1 0	<b>A</b> 2 1.0 0.8 sions of	<b>A</b> <sub>3</sub> 0.15	<b>b</b> p 0.30 0.15	c 0.25 0.08 num per s	sca D(1) 2.25 1.85 side are REFEF	E(1) 1.35 1.15 e not inc RENCES	0.65 Iuded.	<b>e</b> 1 1.3	2.25		0.46 0.21	0.3	0.1 PEAN	0.1	0.60	7° 0°

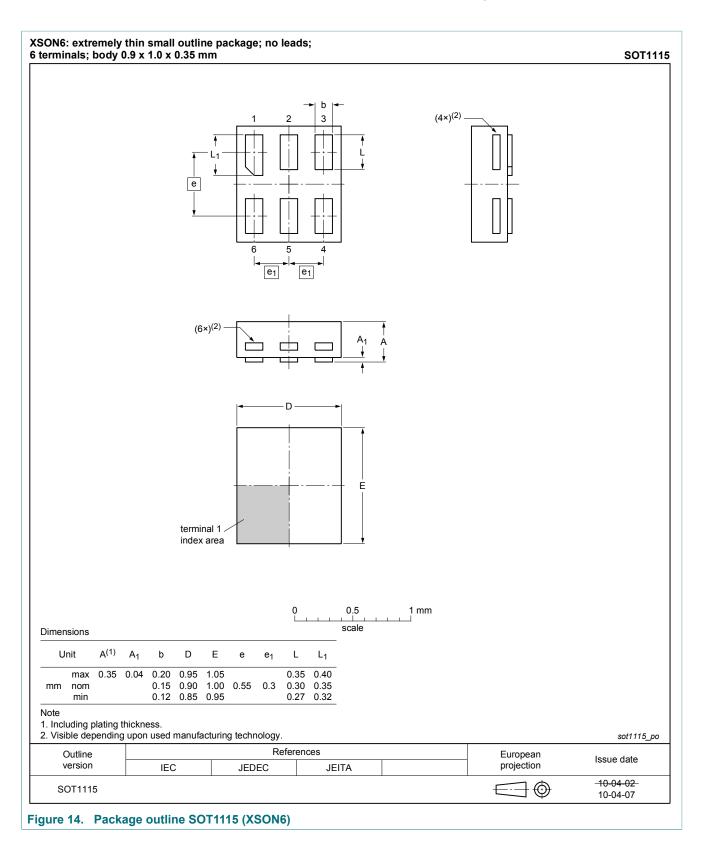
#### Low-power buffer/line driver; 3-state



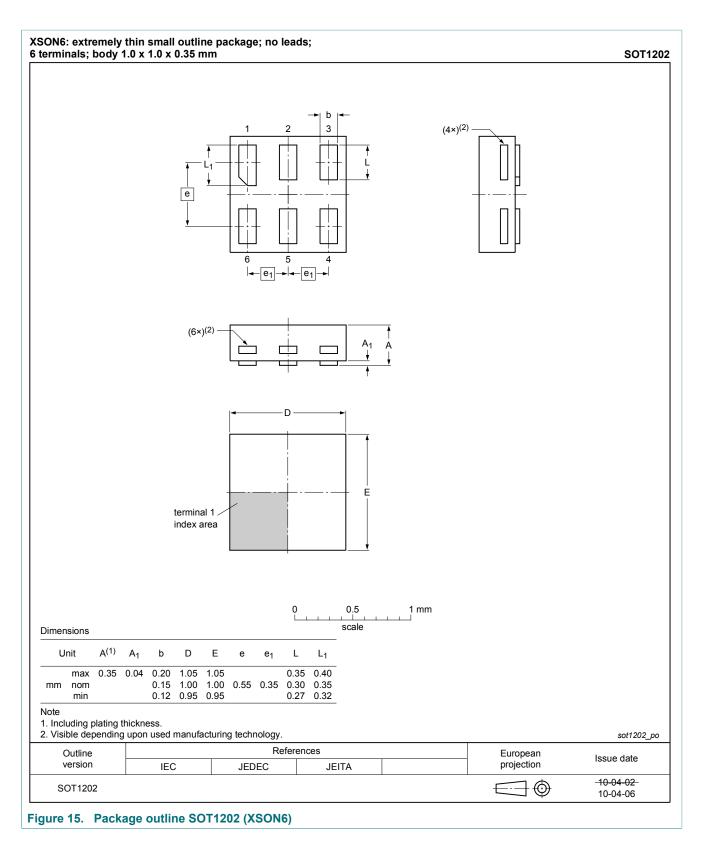
#### Low-power buffer/line driver; 3-state



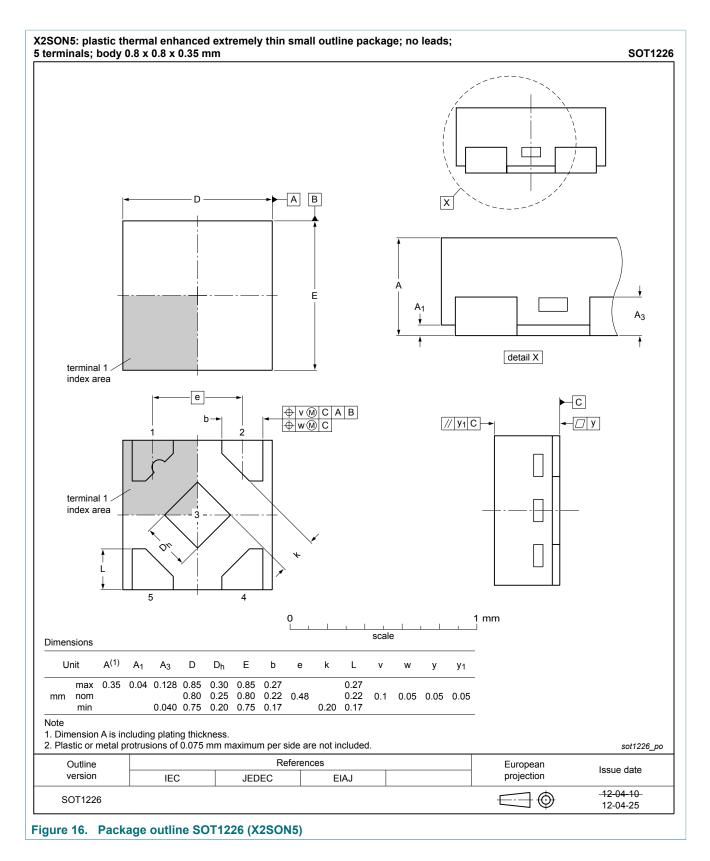
#### Low-power buffer/line driver; 3-state



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



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



Low-power buffer/line driver; 3-state

# **13 Abbreviations**

Table 13. Abbrevia	ations
Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
НВМ	Human Body Model
MM	Machine Model

# 14 Revision history

#### Table 14. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes					
74AUP1G126 v.7	20180516	Product data sheet	-	74AUP1G126 v.6					
Modifications:	Nexperia.	data sheet has been redesigned een adapted to the new compar							
74AUP1G126 v.6	20151002	Product data sheet	-	74AUP1G126 v.5					
Modifications:	<ul> <li>I<sub>OK</sub> minimum changed from -0.5 mA to -50 mA (errata) in <u>Table 5</u></li> </ul>								
74AUP1G126 v.5	20120628	Product data sheet	-	74AUP1G126 v.4					
Modifications:		er 74AUP1G126GX (SOT1226) rawing of SOT886 (Figure 12) n							
74AUP1G126 v.4	20111124	Product data sheet	-	74AUP1G126 v.3					
74AUP1G126 v.3	20100903	Product data sheet	-	74AUP1G126 v.2					
74AUP1G126 v.2	20060628	Product data sheet	-	74AUP1G126 v.1					
74AUP1G126 v.1	20050725	Product data sheet	-	-					

# 15 Legal information

### 15.1 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.

Please consult the most recently issued document before initiating or completing a design. [1]

The term 'short data sheet' is explained in section "Definitions".

[2] [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.nexperia.com.

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# 74AUP1G126

Low-power buffer/line driver; 3-state

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Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

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