

# 74AUP2G125

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

Rev. 03 — 9 April 2008

Product data sheet

## 1. General description

The 74AUP2G125 provides the dual non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input ( $\overline{nOE}$ ). A HIGH level at pin  $\overline{nOE}$  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 ( $\overline{nOE}$ ) 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 a damaging backflow current through the device when it is powered down.

## 2. Features

- 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-A114E Class 3A exceeds 5000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
  - ◆ CDM JESD22-C101C exceeds 1000 V
- Low static power consumption;  $I_{CC} = 0.9 \mu\text{A}$  (maximum)
- Latch-up performance exceeds 100 mA per JESD78 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

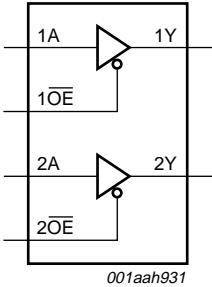
Type number	Package			Version
	Temperature range	Name	Description	
74AUP2G125DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AUP2G125GT	-40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 × 1.95 × 0.5 mm	SOT833-1
74AUP2G125GM	-40 °C to +125 °C	XQFN8U	plastic extremely thin quad flat package; no leads; 8 terminals; UTLP based; body 1.6 × 1.6 × 0.5 mm	SOT902-1

### 4. Marking

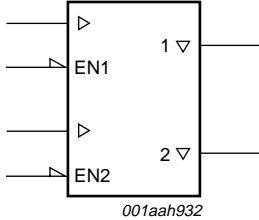
Table 2. Marking codes

Type number	Marking code
74AUP2G125DC	p25
74AUP2G125GT	p25
74AUP2G125GM	p25

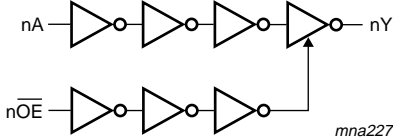
### 5. Functional diagram



**Fig 1. Logic symbol**



**Fig 2. IEC logic symbol**



**Fig 3. Logic diagram (one gate)**

## 6. Pinning information

### 6.1 Pinning

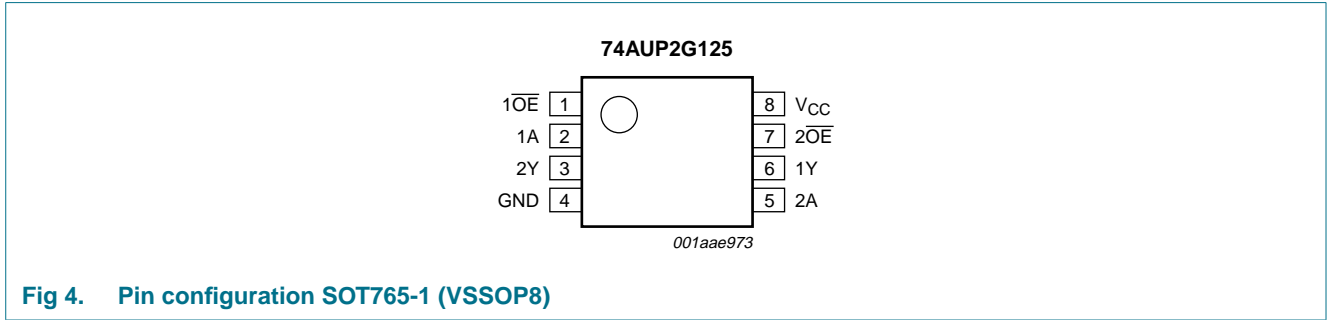


Fig 4. Pin configuration SOT765-1 (VSSOP8)

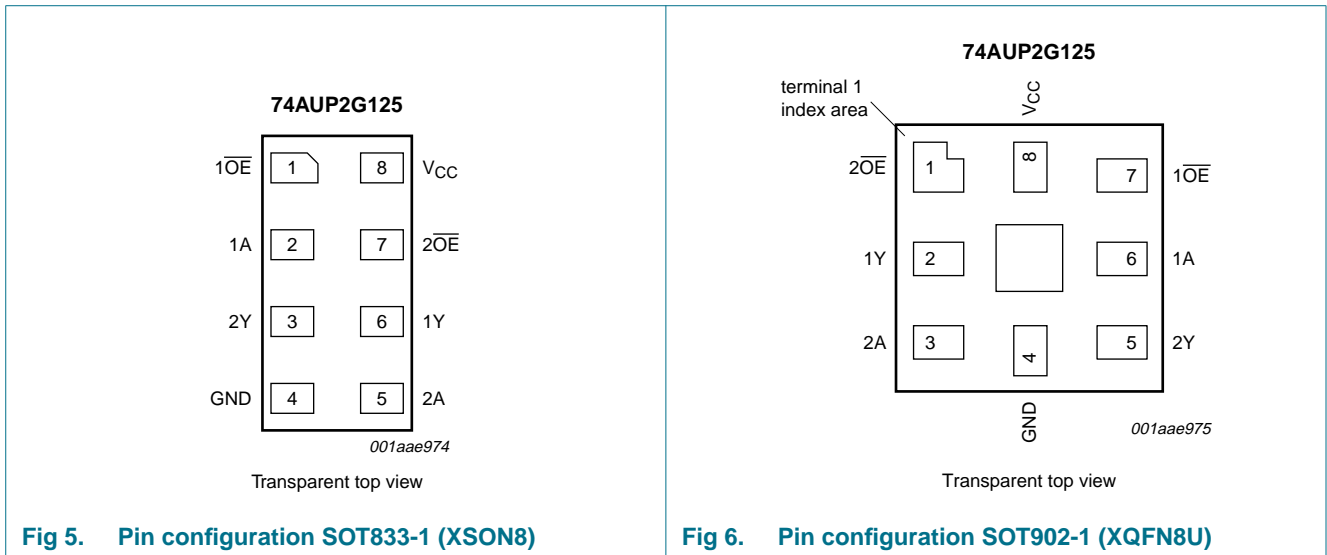


Fig 5. Pin configuration SOT833-1 (XSON8)

Fig 6. Pin configuration SOT902-1 (XQFN8U)

### 6.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	SOT765-1 and SOT833-1	SOT902-1	
1OE	1	7	output enable input 1 (active LOW)
1A	2	6	data input 1
2Y	3	5	data output 2
GND	4	4	ground (0 V)
2A	5	3	data input 2
1Y	6	2	data output 1
2OE	7	1	output enable input 2 (active LOW)
V <sub>CC</sub>	8	8	supply voltage

## 7. Functional description

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

Input		Output
nOE	nA	nY
L	L	L
L	H	H
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 <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 VSSOP8 packages: above 110 °C the value of P<sub>tot</sub> derates linearly at 8.0 mW/K.  
 For XSON8 and XQFN8U packages: above 45 °C the value of P<sub>tot</sub> derates linearly at 2.4 mW/K.

## 9. Recommended operating conditions

Table 6. Operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	supply voltage		0.8	3.6	V
V <sub>I</sub>	input voltage		0	3.6	V
V <sub>O</sub>	output voltage	Active mode	0	V <sub>CC</sub>	V
		Power-down mode; V <sub>CC</sub> = 0 V	0	3.6	V
T <sub>amb</sub>	ambient temperature		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 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; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	-	40	$\mu$ A
		n $\overline{OE}$ input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	-	110	$\mu$ A
		all inputs; $V_I =$ GND to 3.6 V; n $\overline{OE} =$ GND; $V_{CC} = 0.8$ V to 3.6 V	[2]	-	-	1	$\mu$ A
$C_I$	input capacitance	$V_I =$ GND or $V_{CC}$ ; $V_{CC} = 0$ V to 3.6 V	-	0.8	-	pF	
$C_O$	output capacitance	output enabled; $V_O =$ GND; $V_{CC} = 0$ V	-	1.4	-	pF	
		output disabled; $V_O =$ GND or $V_{CC}$ ; $V_{CC} = 0$ V to 3.6 V	-	1.3	-	pF	
<b><math>T_{amb} = -40</math> °C to <math>+85</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	$0.7 \times V_{CC}$	-	-	V	
		$I_O = -1.7$ mA; $V_{CC} = 1.4$ V	1.03	-	-	V	
		$I_O = -1.9$ mA; $V_{CC} = 1.65$ V	1.30	-	-	V	
		$I_O = -2.3$ mA; $V_{CC} = 2.3$ V	1.97	-	-	V	
		$I_O = -3.1$ mA; $V_{CC} = 2.3$ V	1.85	-	-	V	
		$I_O = -2.7$ mA; $V_{CC} = 3.0$ V	2.67	-	-	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	-	-	0.37	V	
		$I_O = 1.9$ mA; $V_{CC} = 1.65$ V	-	-	0.35	V	
		$I_O = 2.3$ mA; $V_{CC} = 2.3$ V	-	-	0.33	V	
		$I_O = 3.1$ mA; $V_{CC} = 2.3$ V	-	-	0.45	V	
		$I_O = 2.7$ mA; $V_{CC} = 3.0$ V	-	-	0.33	V	
$I_I$	input leakage current	$V_I =$ GND to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	$\pm 0.5$	$\mu$ A	
		$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	$\pm 0.5$	$\mu$ A	
$I_{OFF}$	power-off leakage current	$V_I$ or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	$\pm 0.5$	$\mu$ 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 $V_O = 0\text{ V to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V to }0.2\text{ V}$	-	-	$\pm 0.6$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND or }V_{CC}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	-	-	0.9	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	data input; $V_I = V_{CC} - 0.6\text{ V}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 3.3\text{ V}$	[1]	-	50	$\mu\text{A}$
		$\overline{nOE}$ input; $V_I = V_{CC} - 0.6\text{ V}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 3.3\text{ V}$	[1]	-	120	$\mu\text{A}$
		all inputs; $V_I = \text{GND to }3.6\text{ V}$ ; $\overline{nOE} = \text{GND}$ ; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	[2]	-	1	$\mu\text{A}$
<b><math>T_{amb} = -40\text{ }^\circ\text{C to }+125\text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8\text{ V}$	$0.75 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9\text{ V to }1.95\text{ V}$	$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.6	-	-	V
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	2.0	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8\text{ V}$	-	-	$0.25 \times V_{CC}$	V
		$V_{CC} = 0.9\text{ V to }1.95\text{ V}$	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	0.7	V
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	-	0.9	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -20\text{ }\mu\text{A}$ ; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	$V_{CC} - 0.11$	-	-	V
		$I_O = -1.1\text{ mA}$ ; $V_{CC} = 1.1\text{ V}$	$0.6 \times V_{CC}$	-	-	V
		$I_O = -1.7\text{ mA}$ ; $V_{CC} = 1.4\text{ V}$	0.93	-	-	V
		$I_O = -1.9\text{ mA}$ ; $V_{CC} = 1.65\text{ V}$	1.17	-	-	V
		$I_O = -2.3\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	1.77	-	-	V
		$I_O = -3.1\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	1.67	-	-	V
		$I_O = -2.7\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	2.40	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 20\text{ }\mu\text{A}$ ; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	-	-	0.11	V
		$I_O = 1.1\text{ mA}$ ; $V_{CC} = 1.1\text{ V}$	-	-	$0.33 \times V_{CC}$	V
		$I_O = 1.7\text{ mA}$ ; $V_{CC} = 1.4\text{ V}$	-	-	0.41	V
		$I_O = 1.9\text{ mA}$ ; $V_{CC} = 1.65\text{ V}$	-	-	0.39	V
		$I_O = 2.3\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	-	-	0.36	V
		$I_O = 3.1\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	-	-	0.50	V
		$I_O = 2.7\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	-	-	0.36	V
$I_I$	input leakage current	$V_I = \text{GND to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V to }3.6\text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
		$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = 0\text{ V to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V to }3.6\text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I$ or $V_O = 0\text{ V to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$

**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	-	-	$\pm 0.75$	$\mu$ 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
		$\overline{nOE}$ 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; $\overline{nOE} = GND$ ; $V_{CC} = 0.8$ 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 9](#).

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

$C_L = 5$  pF

$t_{pd}$	propagation delay	nA to nY; see <a href="#">Figure 7</a> [2]							
		$V_{CC} = 0.8$ V	-	20.6	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	2.8	5.5	10.5	2.5	11.7	12.9	ns
		$V_{CC} = 1.4$ V to 1.6 V	2.2	3.9	6.1	2.0	7.3	8.1	ns
		$V_{CC} = 1.65$ V to 1.95 V	1.9	3.2	4.8	1.7	6.1	6.7	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.6	2.6	3.6	1.4	4.3	4.9	ns
		$V_{CC} = 3.0$ V to 3.6 V	1.4	2.4	3.1	1.2	3.9	4.4	ns
$t_{en}$	enable time	$\overline{nOE}$ to nY; see <a href="#">Figure 8</a> [3]							
		$V_{CC} = 0.8$ V	-	69.9	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	3.1	6.1	11.8	2.9	13.9	15.4	ns
		$V_{CC} = 1.4$ V to 1.6 V	2.5	4.2	6.6	2.3	7.7	8.3	ns
		$V_{CC} = 1.65$ V to 1.95 V	2.1	3.4	5.1	2.0	6.2	6.8	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.8	2.6	3.7	1.7	4.5	5.0	ns
		$V_{CC} = 3.0$ V to 3.6 V	1.7	2.4	3.1	1.7	3.5	3.9	ns
$t_{dis}$	disable time	$\overline{nOE}$ to nY; see <a href="#">Figure 8</a> [4]							
		$V_{CC} = 0.8$ V	-	14.3	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	2.7	4.3	6.5	2.7	7.3	8.2	ns
		$V_{CC} = 1.4$ V to 1.6 V	2.1	3.2	4.4	2.1	5.1	5.7	ns
		$V_{CC} = 1.65$ V to 1.95 V	2.0	3.0	4.3	2.0	5.0	5.7	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.4	2.2	2.9	1.4	3.3	4.1	ns
		$V_{CC} = 3.0$ V to 3.6 V	1.7	2.5	3.2	1.7	3.4	3.9	ns



**Table 8. Dynamic characteristics ...continued**  
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#).

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	nA to nY; see <a href="#">Figure 7</a>	<a href="#">[2]</a>						
		V <sub>CC</sub> = 0.8 V	-	24.0	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.2	6.4	12.3	3.0	13.8	15.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	4.5	7.3	1.9	8.5	9.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	3.8	5.5	1.7	6.8	7.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.2	4.2	1.6	5.3	5.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.8	3.0	3.8	1.6	4.6	5.2	ns
t <sub>en</sub>	enable time	n $\overline{\text{OE}}$ to nY; see <a href="#">Figure 8</a>	<a href="#">[3]</a>						
		V <sub>CC</sub> = 0.8 V	-	73.7	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.6	6.9	13.5	3.4	15.8	17.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.3	4.8	7.7	2.2	8.6	9.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	3.9	5.8	1.9	6.8	7.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.8	3.2	4.3	1.7	5.3	5.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	3.0	3.9	1.7	4.3	4.8	ns
t <sub>dis</sub>	disable time	n $\overline{\text{OE}}$ to nY; see <a href="#">Figure 8</a>	<a href="#">[4]</a>						
		V <sub>CC</sub> = 0.8 V	-	32.7	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.4	5.4	7.9	3.4	8.8	9.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.1	5.5	2.2	6.2	7.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.2	4.2	5.6	1.9	6.3	7.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	3.0	3.8	1.7	4.5	5.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.1	3.8	4.8	1.7	5.0	5.6	ns
<b>C<sub>L</sub> = 15 pF</b>									
t <sub>pd</sub>	propagation delay	nA to nY; see <a href="#">Figure 7</a>	<a href="#">[2]</a>						
		V <sub>CC</sub> = 0.8 V	-	27.4	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.6	7.2	14.1	3.3	15.8	17.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.1	8.1	2.5	9.8	10.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.2	4.3	6.3	2.0	7.9	8.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	3.7	4.9	1.8	6.0	6.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.5	4.4	1.8	5.4	6.1	ns
t <sub>en</sub>	enable time	n $\overline{\text{OE}}$ to nY; see <a href="#">Figure 8</a>	<a href="#">[3]</a>						
		V <sub>CC</sub> = 0.8 V	-	77.5	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.0	7.7	15.2	3.7	17.6	19.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.3	8.4	2.5	9.8	10.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	4.4	6.5	2.1	7.7	8.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.6	5.0	2.0	6.1	6.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.5	4.4	1.9	4.9	5.5	ns

**Table 8. Dynamic characteristics ...continued**  
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#).

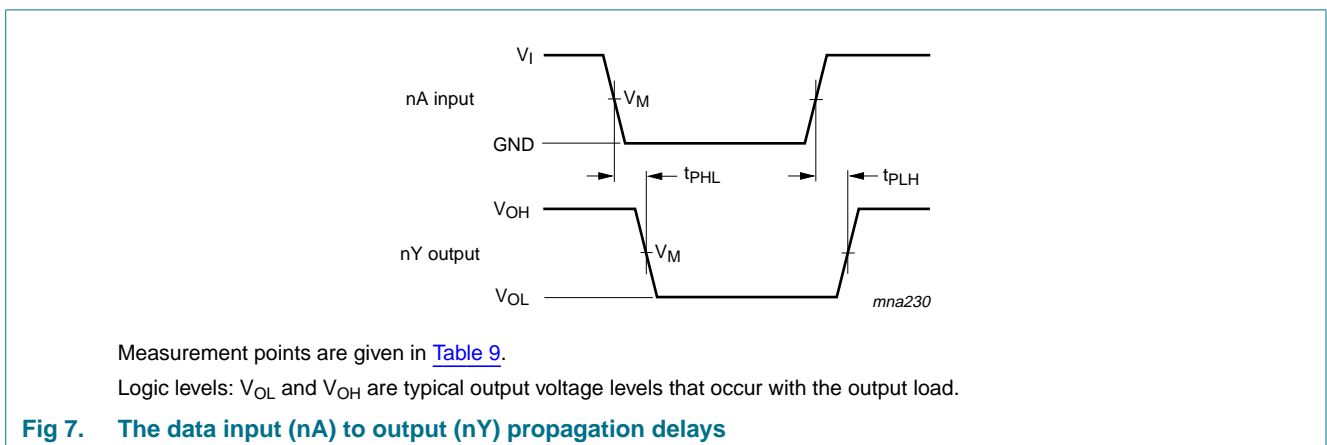
Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
t <sub>dis</sub>	disable time	n $\overline{O}E$ to nY; see <a href="#">Figure 8</a> <sup>[4]</sup>							
		V <sub>CC</sub> = 0.8 V	-	60.8	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.3	6.5	9.2	3.7	10.3	11.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.0	6.5	2.5	7.4	8.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	5.3	7.0	2.1	7.4	8.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.8	4.9	2.0	5.1	6.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.9	5.0	6.2	1.9	6.6	7.4	ns
<b>C<sub>L</sub> = 30 pF</b>									
t <sub>pd</sub>	propagation delay	nA to nY; see <a href="#">Figure 7</a> <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	19.0	4.4	21.6	24.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	6.7	10.8	3.0	13.0	14.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.9	5.6	8.4	2.6	10.3	11.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.7	4.8	6.3	2.5	7.8	8.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	4.6	5.8	2.5	7.5	8.3	ns
t <sub>en</sub>	enable time	n $\overline{O}E$ to nY; see <a href="#">Figure 8</a> <sup>[3]</sup>							
		V <sub>CC</sub> = 0.8 V	-	88.9	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	5.2	9.9	19.8	4.8	22.8	25.3	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	6.8	10.8	3.1	12.6	14.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	5.6	8.5	2.8	10.2	11.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.7	4.8	6.5	2.6	7.8	8.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	4.6	6.0	2.6	6.9	7.7	ns
t <sub>dis</sub>	disable time	n $\overline{O}E$ to nY; see <a href="#">Figure 8</a> <sup>[4]</sup>							
		V <sub>CC</sub> = 0.8 V	-	49.9	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	6.0	9.9	13.3	4.8	14.8	16.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.4	7.7	9.6	3.1	10.8	12.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	5.1	8.7	11.1	2.8	12.4	13.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	3.6	6.2	7.6	2.6	8.6	9.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	5.2	8.7	10.5	2.6	10.8	13.1	ns

**Table 8. Dynamic characteristics ...continued**  
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#).

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	output enabled; 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	-	2.8	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	2.9	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	3.0	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.6	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.2	-	-	-	-	pF

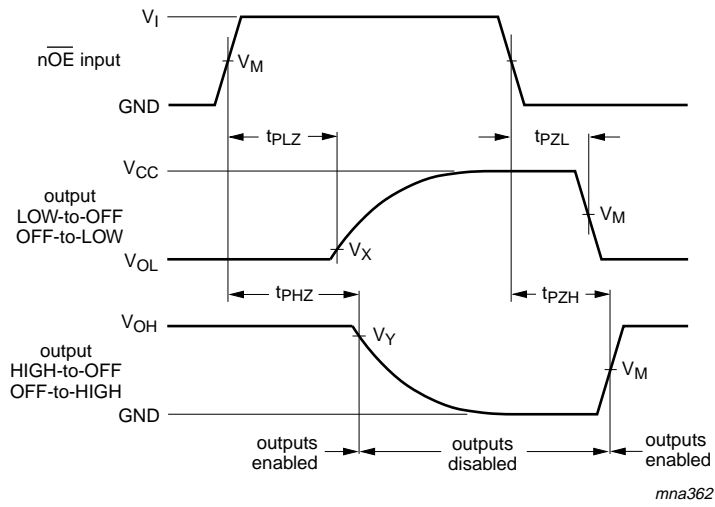
- [1] All typical values are measured at nominal V<sub>CC</sub>.
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.
- [3] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.
- [4] t<sub>dis</sub> is the same as t<sub>PHZ</sub> and t<sub>PLZ</sub>.
- [5] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where:  
 f<sub>i</sub> = input frequency in MHz;  
 f<sub>o</sub> = output frequency in MHz;  
 C<sub>L</sub> = output load capacitance in pF;  
 V<sub>CC</sub> = supply voltage in V;  
 N = number of inputs switching;  
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = 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



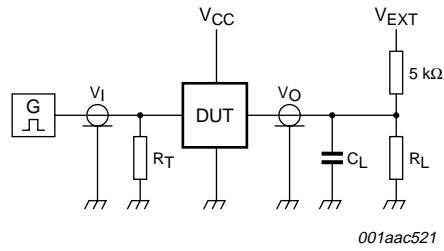
Measurement points are given in [Table 10](#).

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

**Fig 8. Enable and disable times**

**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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.1 \text{ V}$	$V_{OH} - 0.1 \text{ V}$
1.65 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15 \text{ V}$	$V_{OH} - 0.15 \text{ V}$
3.0 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3 \text{ V}$	$V_{OH} - 0.3 \text{ V}$



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 9. Load circuitry for 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, set-up and hold times, and pulse width,  $R_L = 1 \text{ M}\Omega$ .

13. Package outline

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

SOT765-1

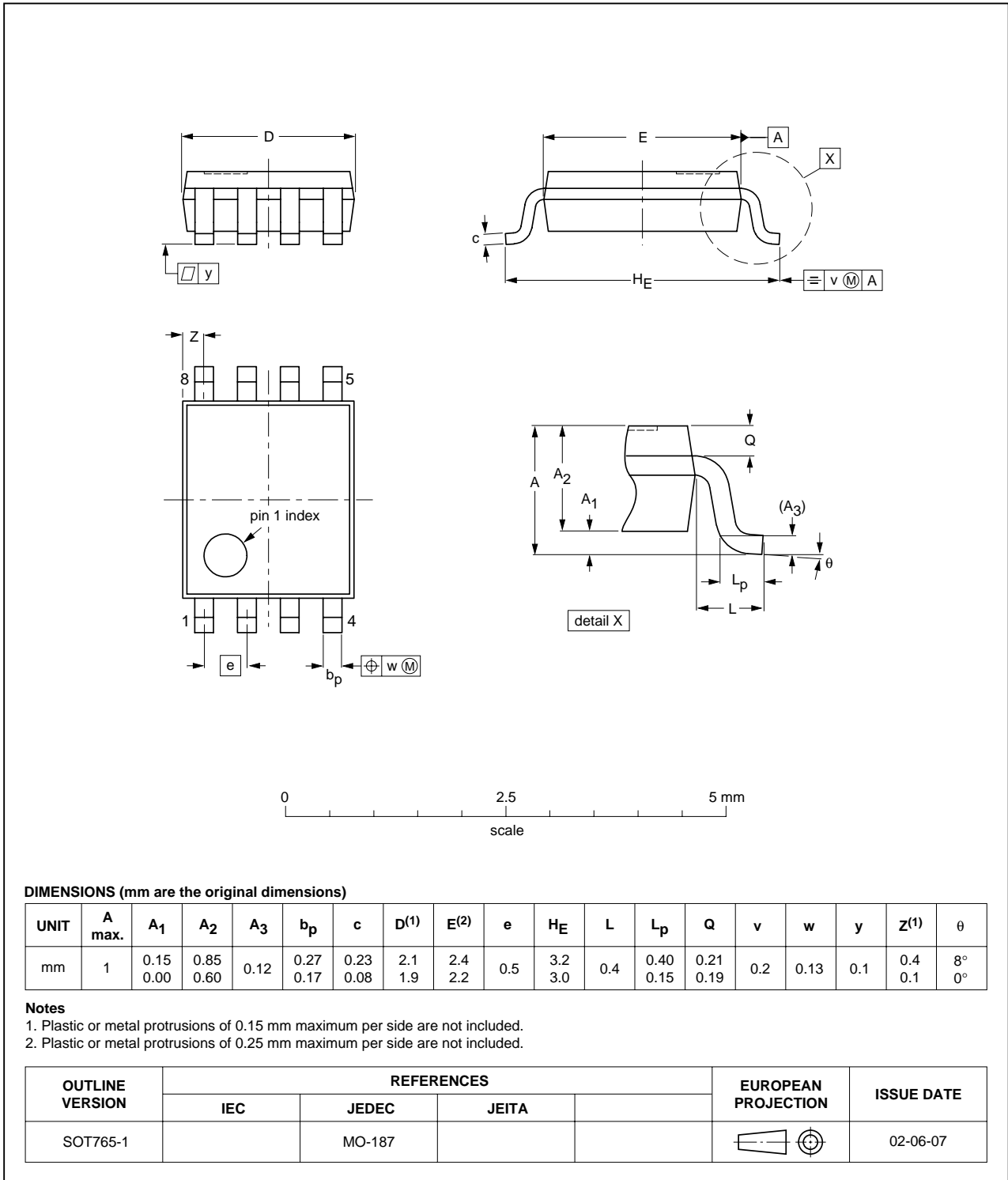


Fig 10. Package outline SOT765-1 (VSSOP8)

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

SOT833-1

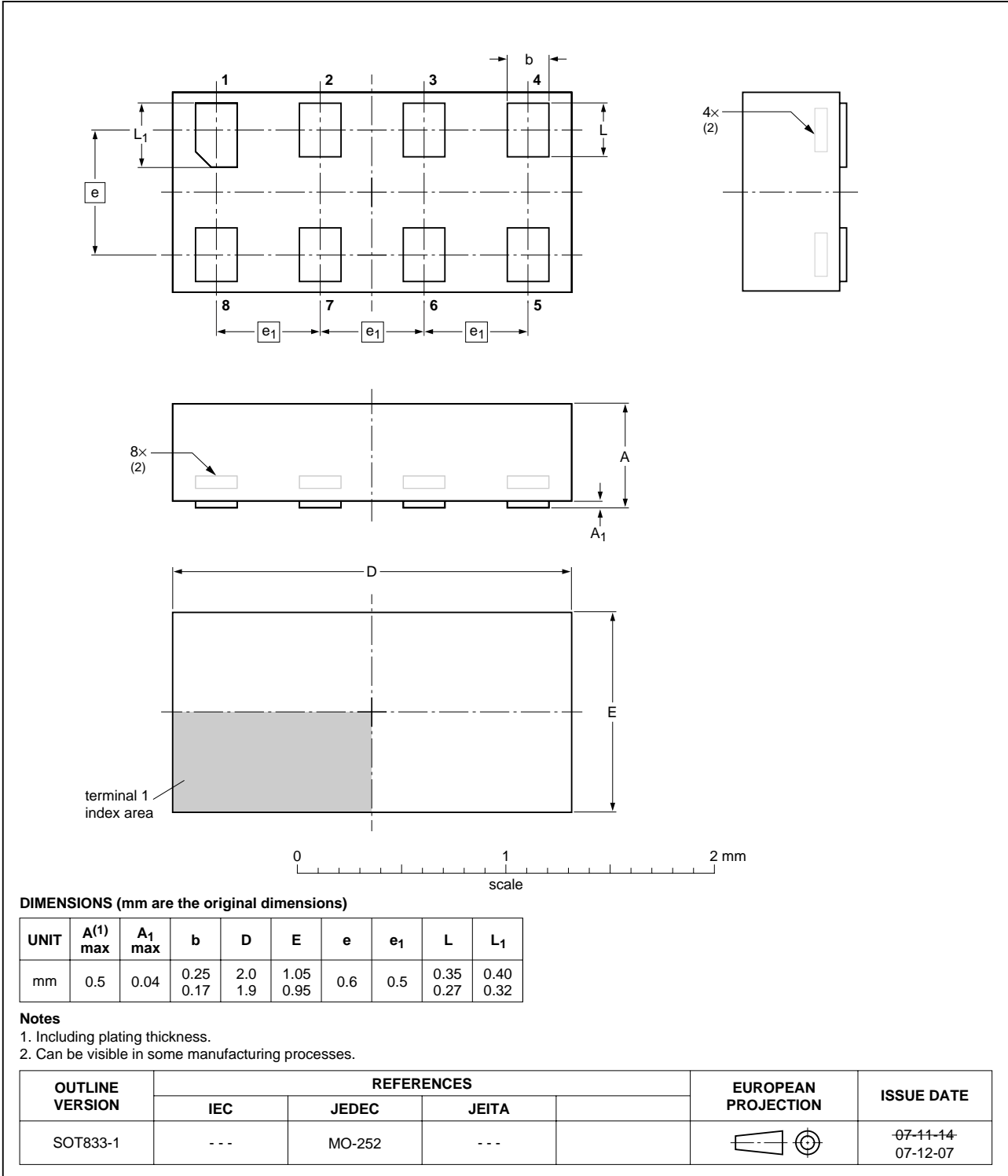


Fig 11. Package outline SOT833-1 (XSON8)

XQFN8U: plastic extremely thin quad flat package; no leads; 8 terminals; UTLP based; body 1.6 x 1.6 x 0.5 mm

SOT902-1

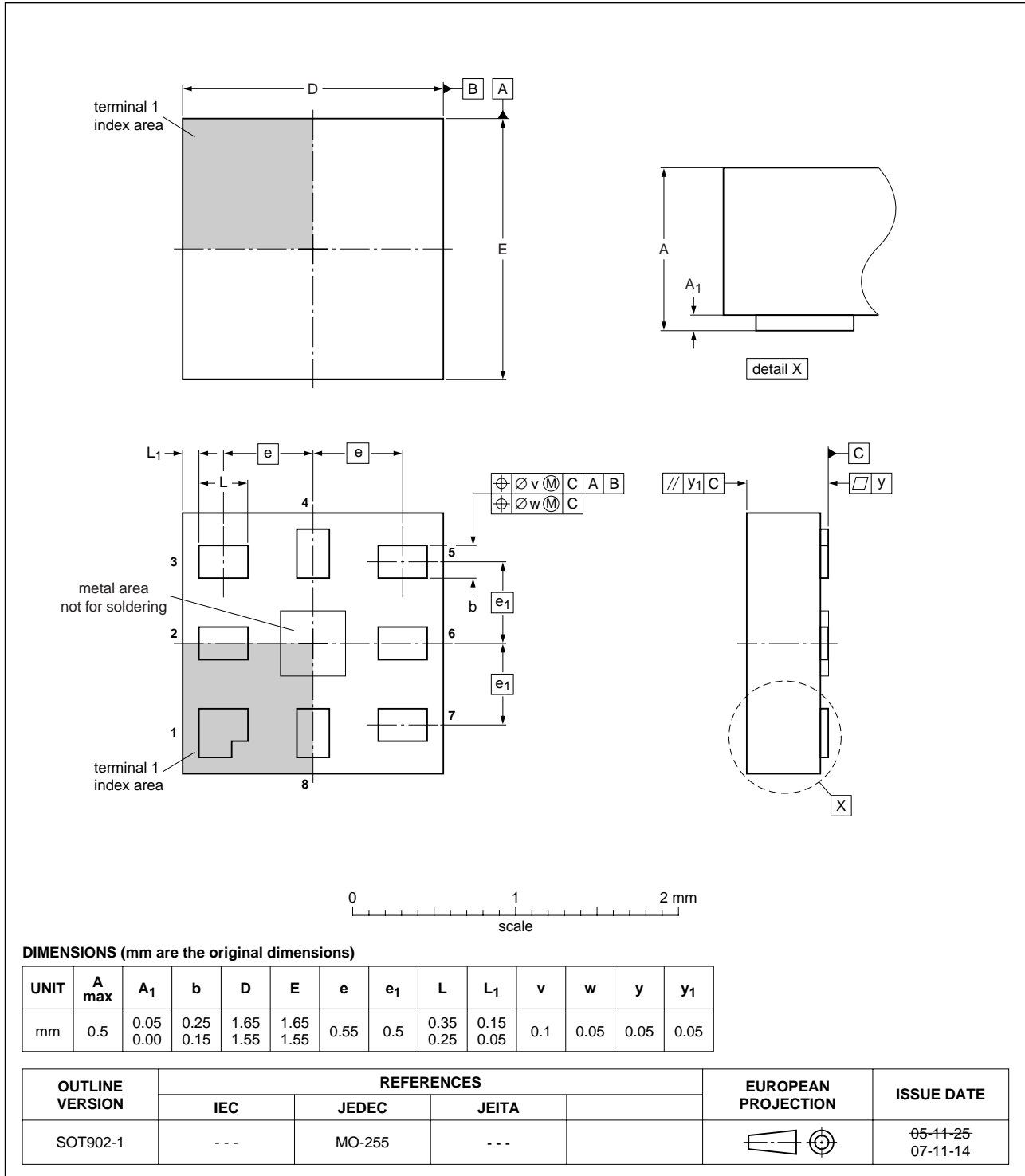


Fig 12. Package outline SOT902-1 (XQFN8U)



## 14. Abbreviations

Table 12. Abbreviations

Acronym	Description
CDM	Charged Device Model
CMOS	Complementary Metal-Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MM	Machine Model
TTL	Transistor-Transistor Logic

## 15. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G125_3	20080409	Product data sheet	-	74AUP2G125_2
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Figure 1</a>: Pin numbers removed from logic symbol</li> <li>• <a href="#">Figure 2</a>: IEC logic symbol added</li> <li>• <a href="#">Figure 12</a>: Package outline drawing updated to latest version</li> </ul>			
74AUP2G125_2	20070419	Product data sheet	-	74AUP2G125_1
74AUP2G125_1	20061017	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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