

# 74AUP1T1326

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

Rev. 01 — 20 January 2009

Product data sheet

## 1. General description

The 74AUP1T1326 is a high-performance, low-power, low-voltage, single-bit, dual supply buffer/line driver with output enable circuitry.

The 74AUP1T1326 is designed for logic-level translation applications and combines the functions of the 74AUP1G32 and 74AUP1G126. The buffer/line driver is controlled by two output enable Schmitt trigger inputs (1OE and 2OE) through an OR-gate. The output enable inputs accept standard input signals and are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. The output of the OR-gate is also available at output 1Y.

The output enable inputs (1OE and 2OE) switch at different points for positive and negative-going signals. The difference between the positive voltage  $V_{T+}$  and the negative voltage  $V_{T-}$  is defined as the input hysteresis voltage  $V_H$ .

Both  $V_{CC(A)}$  and  $V_{CC(B)}$  can be supplied at any voltage between 1.1 V and 3.6 V making the device suitable for interfacing between any of the low voltage nodes (1.2 V, 1.5 V, 1.8 V, 2.5 V and 3.3 V) with compatible input levels. Pins 1OE, 2OE and 1Y are referenced to  $V_{CC(A)}$  and pins A and 2Y are referenced to  $V_{CC(B)}$ . A logic LOW on both output enable pins causes the output 2Y to assume a high-impedance OFF-state.

The device ensures low static and dynamic power consumption and is fully specified for partial power down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the outputs, preventing any damaging backflow current through the device when it is powered down.

## 2. Features

- Wide supply voltage range:
  - ◆  $V_{CC(A)}$ : 1.1 V to 3.6 V;  $V_{CC(B)}$ : 1.1 V to 3.6 V.
- High noise immunity
- Complies with JEDEC standards:
  - ◆ 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 2A exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
  - ◆ CDM JESD22-C101C 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  $V_{CC}$
- $I_{OFF}$  circuitry provides partial Power-down mode operation
- Multiple package options
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$

3. Ordering information

Table 1. Ordering information

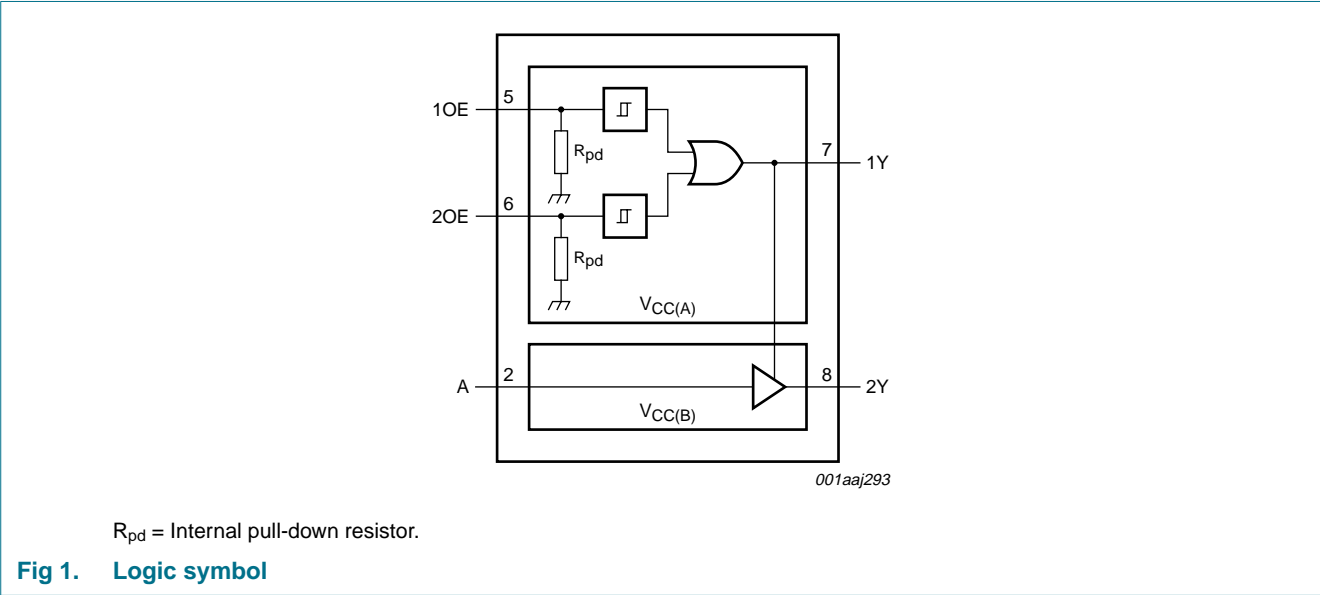
Type number	Package			
	Temperature range	Name	Description	Version
74AUP1T1326GT	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm	SOT833-1

4. Marking

Table 2. Marking

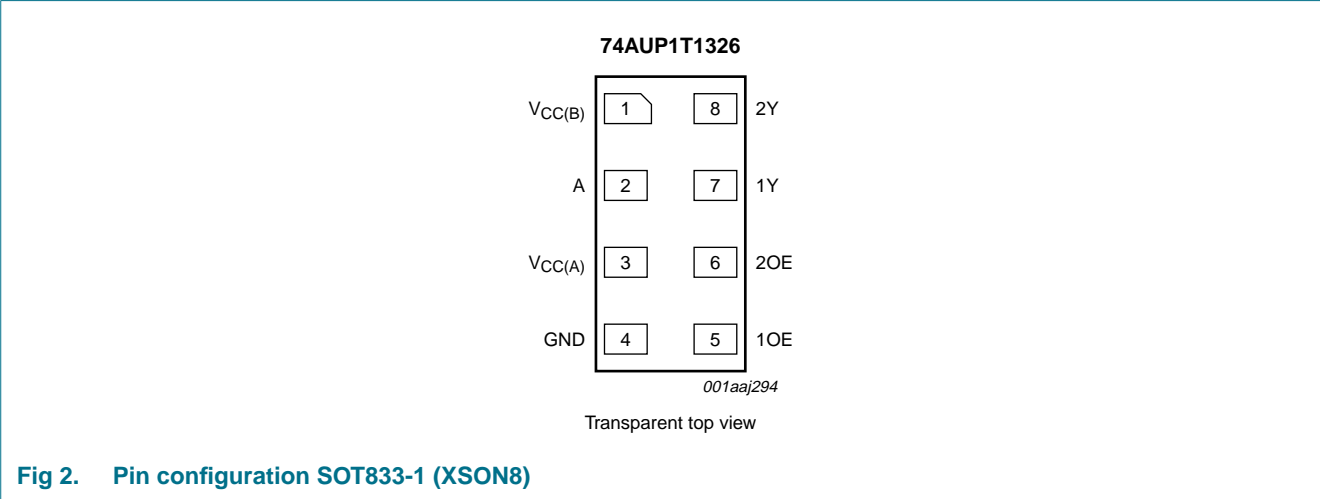
Type number	Marking code
74AUP1T1326GT	p31

5. Functional diagram



6. Pinning information

6.1 Pinning



6.2 Pin description

Table 3. Pin description

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

7. Functional description

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

Input			Output	
1OE	2OE	A	1Y	2Y
L	L	X	L	Z
X	H	L	H	L
X	H	H	H	H
H	X	L	H	L
H	X	H	H	H

[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
$V_{CC(A)}$	supply voltage A		-0.5	+4.6	V
$V_{CC(B)}$	supply voltage B		-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	$V_O > V_{CCO}$ or $V_O < 0$ V	[2] -	-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 $V_{CCO}$	[2] -	±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 +85 °C	[3] -	250	mW

[1] The minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2]  $V_{CCO}$  is the supply voltage associated with an output pin.

[3] For XSON8 package: above 45 °C the value of  $P_{tot}$  derates linearly with 2.4 mW/K.

## 9. Recommended operating conditions

**Table 6. Recommended operating conditions**

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC(A)}$	supply voltage A		1.1	3.6	V
$V_{CC(B)}$	supply voltage B		1.1	3.6	V
$V_I$	input voltage		0	3.6	V
$V_O$	output voltage		[1] 0	$V_{CCO}$	V
$T_{amb}$	ambient temperature		-40	+85	°C
$\Delta t/\Delta V$	input transition rise and fall rate	input A; $V_{CCI} = 1.1$ V to 3.6 V	[2] -	200	ns/V
		input nOE; $V_{CCI} = 1.1$ V to 3.6 V	[2] -	30	ms/V

[1]  $V_{CCO}$  is the supply voltage associated with an output pin.

[2]  $V_{CCI}$  is the supply voltage associated with an input pin.

## 10. Static characteristics

**Table 7. Static characteristics**

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

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ	Max	Min	Max	
T <sub>amb</sub> = 25 °C								
V <sub>IH</sub>	HIGH-level input voltage	input A; <a href="#">[1][3]</a>						
		V <sub>CCI</sub> = 1.1 V to 1.95 V	0.65V <sub>CCI</sub>	-	-	0.65V <sub>CCI</sub>	-	V
		V <sub>CCI</sub> = 2.3 V to 2.7 V	1.6	-	-	1.6	-	V
		V <sub>CCI</sub> = 3.0 V to 3.6 V	2.0	-	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	input A; <a href="#">[1][3]</a>						
		V <sub>CCI</sub> = 1.1 V to 1.95 V	-	-	0.35V <sub>CCI</sub>	-	0.35V <sub>CCI</sub>	V
		V <sub>CCI</sub> = 2.3 V to 2.7 V	-	-	0.7	-	0.7	V
		V <sub>CCI</sub> = 3.0 V to 3.6 V	-	-	0.9	-	0.9	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IL</sub> or V <sub>I</sub> or V <sub>I</sub> = V <sub>T+</sub> or V <sub>T–</sub>						
		I <sub>O</sub> = –20 µA; <a href="#">[2]</a> V <sub>CCO</sub> = 1.1 V to 3.6 V	V <sub>CCO</sub> – 0.1	-	-	V <sub>CCO</sub> – 0.1	-	V
		I <sub>O</sub> = –1.1 mA; V <sub>CCO</sub> = 1.1 V <a href="#">[2]</a>	0.825	-	-	0.825	-	V
		I <sub>O</sub> = –1.7 mA; V <sub>CCO</sub> = 1.4 V	1.05	-	-	1.05	-	V
		I <sub>O</sub> = –3 mA; V <sub>CCO</sub> = 1.65 V	1.2	-	-	1.2	-	V
		I <sub>O</sub> = –2.3 mA; V <sub>CCO</sub> = 2.3 V	1.97	-	-	1.97	-	V
		I <sub>O</sub> = –4.0 mA; V <sub>CCO</sub> = 2.3 V	2.0	-	-	2.0	-	V
		I <sub>O</sub> = –2.7 mA; V <sub>CCO</sub> = 3.0 V	2.67	-	-	2.67	-	V
		I <sub>O</sub> = –6.0 mA; V <sub>CCO</sub> = 3.0 V	2.48	-	-	2.48	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IL</sub> or V <sub>I</sub> or V <sub>I</sub> = V <sub>T+</sub> or V <sub>T–</sub> <a href="#">[2]</a>						
		I <sub>O</sub> = 20 µA; V <sub>CCO</sub> = 1.1 V to 3.6 V	-	-	0.10	-	0.10	V
		I <sub>O</sub> = 1.1 mA; V <sub>CCO</sub> = 1.1 V	-	-	0.275	-	0.275	V
		I <sub>O</sub> = 1.7 mA; V <sub>CCO</sub> = 1.4 V	-	-	0.35	-	0.35	V
		I <sub>O</sub> = 3.0 mA; V <sub>CCO</sub> = 1.65 V	-	-	0.45	-	0.45	V
		I <sub>O</sub> = 2.3 mA; V <sub>CCO</sub> = 2.3 V	-	-	0.33	-	0.33	V
		I <sub>O</sub> = 4.0 mA; V <sub>CCO</sub> = 2.3 V	-	-	0.40	-	0.40	V
		I <sub>O</sub> = 2.7 mA; V <sub>CCO</sub> = 3.0 V	-	-	0.33	-	0.33	V
		I <sub>O</sub> = 6.0 mA; V <sub>CCO</sub> = 3.0 V	-	-	0.40	-	0.40	V
I <sub>I</sub>	input leakage current	input A; V <sub>I</sub> = 0 V to 3.6 V; V <sub>CCI</sub> = 1.1 V to 3.6 V <a href="#">[1]</a>	-	-	±0.1	-	±0.5	µA
I <sub>OZ</sub>	OFF-state output current	output 2Y; 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(A)</sub> = 1.1 V to 3.6 V; V <sub>CC(B)</sub> = 1.1 V to 3.6 V	-	-	±0.1	-	±0.5	µA

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

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

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ	Max	Min	Max	
$I_{OFF}$	power-off leakage current	1Y; $V_{CC(A)} = 0\text{ V}$ ; $V_O = 0\text{ V to } 3.6\text{ V}$ ; $V_{CC(B)} = 1.1\text{ V to } 3.6\text{ V}$	-	-	$\pm 0.2$	-	$\pm 0.5$	$\mu\text{A}$
		A, 2Y; $V_{CC(B)} = 0\text{ V}$ ; $V_I$ or $V_O = 0\text{ V to } 3.6\text{ V}$ ; $V_{CC(A)} = 1.1\text{ V to } 3.6\text{ V}$	-	-	$\pm 0.2$	-	$\pm 0.5$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	1Y; $V_{CC(A)} = 0\text{ V to } 0.2\text{ V}$ ; $V_O = 0\text{ V to } 3.6\text{ V}$ ; $V_{CC(B)} = 1.1\text{ V to } 3.6\text{ V}$	-	-	$\pm 0.2$	-	$\pm 0.6$	$\mu\text{A}$
		A, 2Y; $V_{CC(B)} = 0\text{ V to } 0.2\text{ V}$ ; $V_I$ or $V_O = 0\text{ V to } 3.6\text{ V}$ ; $V_{CC(A)} = 1.1\text{ V to } 3.6\text{ V}$	-	-	$\pm 0.2$	-	$\pm 0.6$	$\mu\text{A}$
$I_{CC(A)}$	supply current A	$V_I = 0\text{ V or } V_{CC(A)}$ ; $I_O = 0\text{ A}$ [1]						
		$V_{CC(A)} = 1.1\text{ V to } 3.6\text{ V}$ ; $V_{CC(B)} = 0\text{ V to } 3.6\text{ V}$	-	-	0.5	-	0.9	$\mu\text{A}$
$I_{CC(B)}$	supply current B	$V_I = 0\text{ V or } V_{CC(B)}$ ; $I_O = 0\text{ A}$ [1]						
		$V_{CC(A)} = V_{CC(B)} = 1.1\text{ V to } 3.6\text{ V}$	-	-	0.5	-	0.9	$\mu\text{A}$
		$V_{CC(A)} = 1.71\text{ V}$ ; $V_{CC(B)} = 2.6\text{ V}$	-	-	350	-	500	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	nOE; $V_{CC(A)} = V_{CC(B)} = 3.3\text{ V}$ ; $V_I = V_{CC(A)} - 0.6\text{ V}$	-	-	40	-	50	$\mu\text{A}$
		A; $V_{CC(A)} = V_{CC(B)} = 3.3\text{ V}$ ; $V_I = V_{CC(B)} - 0.6\text{ V}$ ;	-	-	40	-	50	$\mu\text{A}$
		A; $V_I = \text{GND to } 3.6\text{ V}$ ; nOE = GND; $V_{CC(A)} = V_{CC(B)} = 1.1\text{ V to } 3.6\text{ V}$ [4]	-	-	-	-	1	$\mu\text{A}$
$R_{pd}$	pull-down resistance		151	281	428	150	435	k $\Omega$
$C_I$	input capacitance	input A; $V_I = 0\text{ V or } V_{CCI}$ ; $V_{CCI} = 1.1\text{ V to } 3.6\text{ V}$ [1]	-	0.9	-	-	-	pF
		input nOE; $V_I = 0\text{ V or } V_{CCI}$ ; $V_{CCI} = 1.1\text{ V to } 3.6\text{ V}$ [1]	-	0.8	-	-	-	pF
$C_O$	output capacitance	1Y; $V_O = \text{GND}$ ; $V_{CCO} = 0\text{ V}$ [2]	-	1.7	-	-	-	pF
		2Y enabled; $V_O = \text{GND}$ ; $V_{CCO} = 0\text{ V}$ [2]	-	1.7	-	-	-	pF
		2Y disabled; $V_{CCO} = 0\text{ V to } 3.6\text{ V}$ ; $V_O = \text{GND or } V_{CCO}$ [2]	-	1.5	-	-	-	pF

[1]  $V_{CCI}$  is the supply voltage associated with the input pin.[2]  $V_{CCO}$  is the supply voltage associated with the output pin.[3] For  $V_{CCI}$  values not specified in the data sheet: minimum  $V_{IH} = 0.7 \times V_{CCI}$  and maximum  $V_{IL} = 0.3 \times V_{CCI}$ .[4] 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 5](#).

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

### $C_L = 5 \text{ pF}$

$t_{pd}$	propagation delay	A to 2Y; see <a href="#">Figure 3</a>						
		<a href="#">[2]</a>						
		$V_{CC(B)} = 1.1 \text{ V to } 1.3 \text{ V}$	3.0	5.4	9.5	2.7	9.7	ns
		$V_{CC(B)} = 1.4 \text{ V to } 1.6 \text{ V}$	2.4	3.8	5.7	2.1	6.1	ns
		$V_{CC(B)} = 1.65 \text{ V to } 1.95 \text{ V}$	1.9	3.1	4.5	1.7	5.0	ns
		$V_{CC(B)} = 2.3 \text{ V to } 2.7 \text{ V}$	1.5	2.3	3.4	1.3	3.8	ns
		$V_{CC(B)} = 3.0 \text{ V to } 3.6 \text{ V}$	1.2	2.1	3.0	1.0	3.3	ns
		nOE to 1Y; see <a href="#">Figure 3</a>						
		$V_{CC(A)} = 1.1 \text{ V to } 1.3 \text{ V}$	3.4	5.6	9.3	3.2	9.5	ns
		$V_{CC(A)} = 1.4 \text{ V to } 1.6 \text{ V}$	2.8	4.2	5.9	2.6	6.3	ns
		$V_{CC(A)} = 1.65 \text{ V to } 1.95 \text{ V}$	2.4	3.5	4.9	2.2	5.3	ns
		$V_{CC(A)} = 2.3 \text{ V to } 2.7 \text{ V}$	2.2	2.9	3.9	2.0	4.1	ns
		$V_{CC(A)} = 3.0 \text{ V to } 3.6 \text{ V}$	1.9	2.6	3.4	1.8	3.7	ns

### $C_L = 10 \text{ pF}$

$t_{pd}$	propagation delay	A to 2Y; see <a href="#">Figure 3</a>						
		<a href="#">[2]</a>						
		$V_{CC(B)} = 1.1 \text{ V to } 1.3 \text{ V}$	3.4	6.2	11.0	3.0	11.4	ns
		$V_{CC(B)} = 1.4 \text{ V to } 1.6 \text{ V}$	2.7	4.4	6.6	2.4	7.1	ns
		$V_{CC(B)} = 1.65 \text{ V to } 1.95 \text{ V}$	2.3	3.6	5.3	2.0	5.8	ns
		$V_{CC(B)} = 2.3 \text{ V to } 2.7 \text{ V}$	1.8	2.8	4.1	1.5	4.5	ns
		$V_{CC(B)} = 3.0 \text{ V to } 3.6 \text{ V}$	1.6	2.6	3.8	1.3	4.2	ns
		nOE to 1Y; see <a href="#">Figure 3</a>						
		$V_{CC(A)} = 1.1 \text{ V to } 1.3 \text{ V}$	3.7	6.4	10.8	3.4	11.1	ns
		$V_{CC(A)} = 1.4 \text{ V to } 1.6 \text{ V}$	3.1	4.7	6.8	2.8	7.2	ns
		$V_{CC(A)} = 1.65 \text{ V to } 1.95 \text{ V}$	2.9	4.0	5.6	2.5	6.1	ns
		$V_{CC(A)} = 2.3 \text{ V to } 2.7 \text{ V}$	2.5	3.4	4.6	2.2	4.9	ns
		$V_{CC(A)} = 3.0 \text{ V to } 3.6 \text{ V}$	2.3	3.1	4.1	2.1	4.5	ns

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

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 5](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
C <sub>L</sub> = 15 pF								
t <sub>pd</sub>	propagation delay	A to 2Y; see <a href="#">Figure 3</a>	<a href="#">[2]</a>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.8	6.9	12.5	3.4	12.9	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.2	4.9	7.5	2.8	8.1	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.7	4.0	6.0	2.3	6.5	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.2	3.2	4.8	1.8	5.3	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	1.8	2.9	4.4	1.6	4.8	ns
		nOE to 1Y; see <a href="#">Figure 3</a>						
		V <sub>CC(A)</sub> = 1.1 V to 1.3 V	4.2	7.2	12.4	3.8	12.7	ns
		V <sub>CC(A)</sub> = 1.4 V to 1.6 V	3.6	5.2	7.6	3.3	8.2	ns
		V <sub>CC(A)</sub> = 1.65 V to 1.95 V	3.1	4.5	6.3	2.7	6.9	ns
		V <sub>CC(A)</sub> = 2.3 V to 2.7 V	2.8	3.8	5.3	2.5	5.6	ns
		V <sub>CC(A)</sub> = 3.0 V to 3.6 V	2.5	3.5	4.8	2.3	5.2	ns
C <sub>L</sub> = 30 pF								
t <sub>pd</sub>	propagation delay	A to 2Y; see <a href="#">Figure 3</a>	<a href="#">[2]</a>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.8	9.0	16.6	4.2	17.3	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.0	6.3	9.8	3.4	10.6	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.5	5.1	7.8	3.0	8.6	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.7	4.2	6.2	2.4	6.8	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	2.5	3.9	5.9	2.3	6.4	ns
		nOE to 1Y; see <a href="#">Figure 3</a>						
		V <sub>CC(A)</sub> = 1.1 V to 1.3 V	5.1	9.2	16.4	4.6	17.1	ns
		V <sub>CC(A)</sub> = 1.4 V to 1.6 V	4.3	6.6	9.9	3.8	10.8	ns
		V <sub>CC(A)</sub> = 1.65 V to 1.95 V	4.0	5.6	8.1	3.5	8.9	ns
		V <sub>CC(A)</sub> = 2.3 V to 2.7 V	3.4	4.7	6.7	3.0	7.2	ns
		V <sub>CC(A)</sub> = 3.0 V to 3.6 V	3.3	4.4	6.2	3.0	6.7	ns
C <sub>L</sub> = 5 pF; V <sub>CC(A)</sub> = 1.1 V to 1.3 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<a href="#">[3]</a>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	8.7	20.0	3.2	20.3	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	7.0	15.6	2.5	15.8	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>	<a href="#">[4]</a>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	7.1	15.2	3.2	15.5	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	6.1	13.5	2.5	13.9	ns



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

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 5](#).

Symbol	Parameter	Conditions	25 °C			−40 °C to +85 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
C <sub>L</sub> = 5 pF; V <sub>CC(A)</sub> = 1.4 V to 1.6 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	7.8	16.6	3.1	17.1	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	6.1	12.2	2.5	12.6	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	5.4	10.7	2.1	11.1	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[4]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	6.3	11.8	3.1	12.3	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	5.3	10.1	2.5	10.7	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	5.4	9.9	2.1	10.5	ns
C <sub>L</sub> = 5 pF; V <sub>CC(A)</sub> = 1.65 V to 1.95 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	7.4	15.6	3.1	16.0	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	5.6	11.2	2.5	11.5	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	4.9	9.7	2.1	10.1	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[4]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	6.0	10.8	3.1	11.2	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	5.0	9.1	2.5	9.6	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	5.1	8.9	2.1	9.4	ns
t <sub>dis</sub>	disable time	V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.2	4.4	8.2	1.9	8.8	ns
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	6.0	10.8	3.1	11.2	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	5.0	9.1	2.5	9.6	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	5.1	8.9	2.1	9.4	ns
t <sub>dis</sub>	disable time	V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.2	4.3	7.8	1.9	8.4	ns
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	6.0	10.8	3.1	11.2	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	5.0	9.1	2.5	9.6	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	5.1	8.9	2.1	9.4	ns
C <sub>L</sub> = 5 pF; V <sub>CC(A)</sub> = 2.3 V to 2.7 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	6.8	14.6	3.1	14.9	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	5.0	10.1	2.5	10.4	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	4.3	8.7	2.1	9.0	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[4]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	5.5	9.8	3.1	10.1	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	4.5	8.1	2.5	8.5	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	4.6	7.9	2.1	8.3	ns
t <sub>dis</sub>	disable time	V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.2	3.9	6.8	1.9	7.3	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.2	3.9	6.8	1.9	7.3	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	1.9	3.6	6.8	1.6	7.3	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	1.9	4.4	7.3	1.6	7.7	ns

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

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 5](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
C <sub>L</sub> = 5 pF; V <sub>CC(A)</sub> = 3.0 V to 3.6 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[3]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	6.5	14.2	3.1	14.4	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	4.8	9.7	2.5	9.9	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	4.1	8.2	2.1	8.5	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.2	3.4	6.7	1.9	7.2	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	1.9	3.2	6.3	1.6	6.8	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[4]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.4	5.3	9.3	3.1	9.7	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	2.8	4.3	7.7	2.5	8.0	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.4	4.4	7.4	2.1	7.9	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.2	3.7	6.4	1.9	6.8	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	1.9	4.2	6.9	1.6	7.2	ns
C <sub>L</sub> = 10 pF; V <sub>CC(A)</sub> = 1.1 V to 1.3 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[3]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	9.9	22.9	3.3	23.1	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	8.0	17.8	2.8	18.1	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[4]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	8.5	18.0	3.3	18.3	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	7.3	16.0	2.8	16.4	ns
C <sub>L</sub> = 10 pF; V <sub>CC(A)</sub> = 1.4 V to 1.6 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[3]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	8.8	18.8	3.3	19.3	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	6.9	13.8	2.8	14.2	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.9	6.1	12.2	2.5	12.9	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[4]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	7.6	14.0	3.3	14.5	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	6.4	11.9	2.8	12.5	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.9	6.7	12.0	2.5	12.6	ns
C <sub>L</sub> = 10 pF; V <sub>CC(A)</sub> = 1.65 V to 1.95 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[3]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	8.3	17.6	3.3	18.1	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	6.4	12.6	2.8	13.1	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.9	5.6	11.0	2.5	11.7	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.5	5.1	9.7	2.2	10.5	ns

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

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 5](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit	
			Min	Typ <sup>[1]</sup>	Max	Min	Max		
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[4]</sup>							
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	7.2	12.8	3.3	13.4	ns	
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	6.0	10.8	2.8	11.4	ns	
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.9	6.3	10.8	2.5	11.5	ns	
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.5	5.2	9.5	2.2	10.1	ns	
C <sub>L</sub> = 10 pF; V <sub>CC(A)</sub> = 2.3 V to 2.7 V									
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>							
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	7.7	16.6	3.3	16.9	ns	
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	5.8	11.6	2.8	11.9	ns	
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.9	5.0	10.0	2.5	10.5	ns	
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.5	4.4	8.7	2.2	9.3	ns	
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[4]</sup>							
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	6.8	11.8	3.3	12.2	ns	
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	5.6	9.7	2.8	10.2	ns	
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.9	5.9	9.8	2.5	10.3	ns	
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.5	4.8	8.4	2.2	8.9	ns	
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>							
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	7.4	16.1	3.3	16.5	ns	
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	5.5	11.1	2.8	11.5	ns	
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.9	4.7	9.5	2.5	10.1	ns	
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.5	4.1	8.3	2.2	8.8	ns	
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[4]</sup>							
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	3.7	6.6	11.3	3.3	11.7	ns	
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.1	5.4	9.3	2.8	9.7	ns	
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	2.9	5.7	9.4	2.5	9.8	ns	
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.5	4.6	8.0	2.2	8.5	ns	
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>							
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	10.9	25.5	3.8	25.9	ns	
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	8.9	20.1	3.2	20.6	ns	
		t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[4]</sup>					
				V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	9.9	20.8	3.8	21.1
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>							
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	8.4	18.4	3.2	18.9	ns	

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

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 5](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
C <sub>L</sub> = 15 pF; V <sub>CC(A)</sub> = 1.4 V to 1.6 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	9.7	20.8	3.8	21.4	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	7.6	15.3	3.2	16.1	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.1	6.8	13.6	2.7	14.5	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	8.9	16.0	3.8	16.6	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	7.4	13.7	3.2	14.4	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.1	8.0	14.1	2.7	14.8	ns
C <sub>L</sub> = 15 pF; V <sub>CC(A)</sub> = 1.65 V to 1.95 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	9.1	19.5	3.8	20.1	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	7.0	14.0	3.1	14.7	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.1	6.2	12.2	2.7	13.2	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.8	5.6	11.0	2.4	11.8	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	8.5	14.7	3.8	15.3	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	7.0	12.4	3.1	13.1	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.1	7.5	12.7	2.7	13.5	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.8	6.1	11.0	2.4	11.8	ns
C <sub>L</sub> = 15 pF; V <sub>CC(A)</sub> = 2.3 V to 2.7 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	8.5	18.4	3.8	18.8	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	6.4	13.0	3.2	13.5	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.1	5.6	11.2	2.7	11.9	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.8	4.9	10.0	2.5	10.6	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	2.5	4.8	9.6	2.3	10.1	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	8.0	13.6	3.8	14.0	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	6.6	11.3	3.2	11.8	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.1	7.1	11.7	2.7	12.3	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.8	5.7	10.0	2.5	10.5	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	2.5	7.1	11.5	2.3	11.9	ns

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

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 5](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
C <sub>L</sub> = 15 pF; V <sub>CC(A)</sub> = 3.0 V to 3.6 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[3]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	8.2	18.0	3.8	18.4	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	6.1	12.5	3.2	13.0	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.1	5.2	10.7	2.7	11.5	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.8	4.6	9.5	2.5	10.1	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	2.5	4.4	9.1	2.3	9.6	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[4]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	4.2	7.8	13.2	3.8	13.6	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	3.6	6.3	10.9	3.2	11.4	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	3.1	6.9	11.3	2.7	11.8	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	2.8	5.5	9.5	2.5	10.0	ns
		V <sub>CC(B)</sub> = 3.0 V to 3.6 V	2.5	6.8	11.0	2.3	11.5	ns
C <sub>L</sub> = 30 pF; V <sub>CC(A)</sub> = 1.1 V to 1.3 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[3]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	13.8	33.1	4.6	33.8	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	11.2	26.1	3.8	27.7	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[4]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	13.9	28.5	4.6	29.2	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	11.7	25.4	3.8	26.2	ns
C <sub>L</sub> = 30 pF; V <sub>CC(A)</sub> = 1.4 V to 1.6 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[3]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	12.1	26.6	4.6	27.5	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	9.5	19.6	3.8	21.4	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	4.0	8.5	17.7	3.5	19.2	ns
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[4]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	12.6	22.0	4.6	22.9	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	10.4	18.9	3.8	19.9	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	4.0	11.6	20.1	3.5	21.2	ns
C <sub>L</sub> = 30 pF; V <sub>CC(A)</sub> = 1.65 V to 1.95 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a>	<sup>[3]</sup>					
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	11.4	24.8	4.6	25.6	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	8.7	17.8	3.8	19.5	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	4.0	7.7	15.9	3.5	17.3	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	3.4	7.1	14.3	3.1	15.3	ns

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

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 5](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
t <sub>dis</sub>	disable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[4]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	12.0	20.2	4.6	21.0	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	9.9	17.1	3.8	18.0	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	4.0	11.1	18.3	3.5	19.3	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	3.4	8.7	15.5	3.2	16.4	ns
C <sub>L</sub> = 30 pF; V <sub>CC(A)</sub> = 2.3 V to 2.7 V								
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	10.6	23.3	4.6	23.9	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	7.9	16.4	3.8	17.8	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	4.0	6.9	14.4	3.5	15.6	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	3.4	6.2	12.8	3.2	13.6	ns
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t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	10.2	22.9	4.6	23.4	ns
		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	7.6	15.9	3.8	17.2	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	4.0	6.6	14.0	3.5	15.1	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	3.4	5.8	12.4	3.2	13.1	ns
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t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>						
		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	10.2	22.9	4.6	23.4	ns
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		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	9.3	15.6	3.8	16.3	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	4.0	10.5	16.8	3.5	17.5	ns
		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	3.4	8.2	14.0	3.2	14.7	ns
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		V <sub>CC(B)</sub> = 1.4 V to 1.6 V	4.3	9.1	15.2	3.8	15.8	ns
		V <sub>CC(B)</sub> = 1.65 V to 1.95 V	4.0	10.2	16.4	3.5	17.0	ns
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		V <sub>CC(B)</sub> = 1.1 V to 1.3 V	5.1	11.5	18.7	4.6	19.3	ns
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		V <sub>CC(B)</sub> = 2.3 V to 2.7 V	3.4	8.2	14.0	3.2	14.7	ns
t <sub>en</sub>	enable time	nOE to 2Y; see <a href="#">Figure 4</a> <sup>[3]</sup>						

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

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 5](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
C <sub>L</sub> = 5 pF, 10 pF, 15 pF and 30 pF								
C <sub>PD</sub>	power dissipation capacitance	output 2Y; f <sub>i</sub> = 1 MHz; <a href="#">[5]</a> V <sub>I</sub> = 0 V to V <sub>CC</sub>						
		V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.2 V	-	2.8	-	-	-	pF
		V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.5 V	-	3.0	-	-	-	pF
		V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.8 V	-	3.0	-	-	-	pF
		V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 2.5 V	-	3.6	-	-	-	pF
		V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 3.3 V	-	4.1	-	-	-	pF

[1] All typical values are measured at nominal V<sub>CC(A)</sub> and V<sub>CC(B)</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;

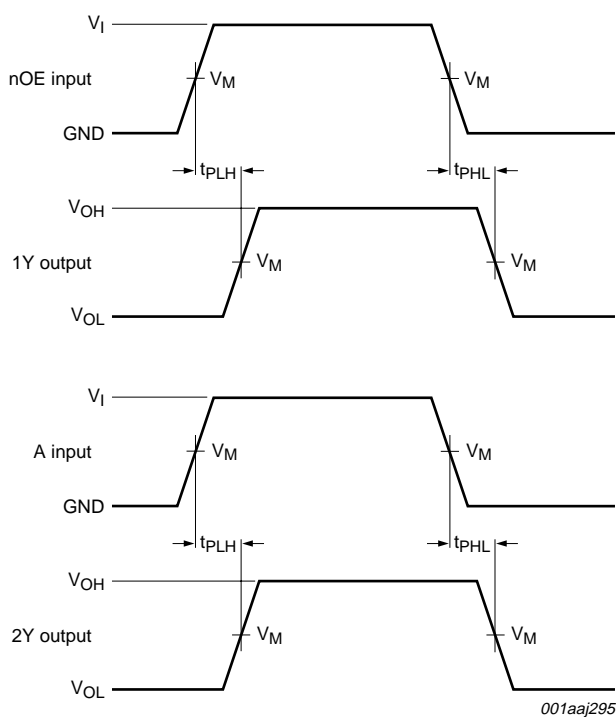
C<sub>L</sub> = load capacitance in pF;

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

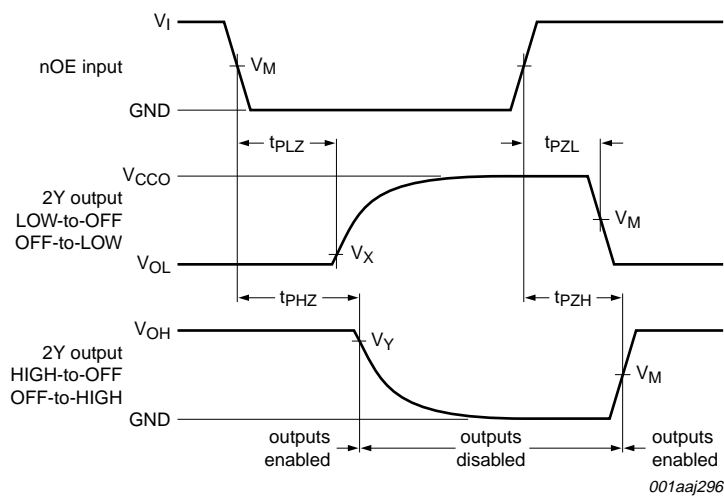


Measurement points are given in [Table 9](#).

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

**Fig 3. Input nOE to output 1Y and A to output 2Y propagation delay times**





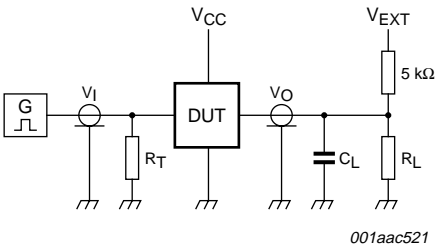
Measurement points are given in [Table 9](#).  
V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage levels that occur with the output load.  
V<sub>CCO</sub> is the supply voltage associated with the output pin.  
Output 1Y has no external load.

Fig 4. Enable and disable times

Table 9. Measurement points

Supply voltage	Input <sup>[1]</sup>	Output <sup>[2]</sup>		
V <sub>CC(A)</sub> , V <sub>CC(B)</sub>	V <sub>M</sub>	V <sub>M</sub>	V <sub>X</sub>	V <sub>Y</sub>
1.1 V to 1.6 V	0.5V <sub>CCI</sub>	0.5V <sub>CCO</sub>	V <sub>OL</sub> + 0.1 V	V <sub>OH</sub> - 0.1 V
1.65 V to 2.7 V	0.5V <sub>CCI</sub>	0.5V <sub>CCO</sub>	V <sub>OL</sub> + 0.15 V	V <sub>OH</sub> - 0.15 V
3.0 V to 3.6 V	0.5V <sub>CCI</sub>	0.5V <sub>CCO</sub>	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> - 0.3 V

[1] V<sub>CCI</sub> is the supply voltage associated with the data input port.  
[2] V<sub>CCO</sub> is the supply voltage associated with the output port.



Test data is given in [Table 10](#).  
Definitions for test circuit:  
 $R_L$  = Load resistance.  
 $C_L$  = Load capacitance including jig and probe capacitance.  
 $R_T$  = Termination resistance should be equal to the output impedance  $Z_o$  of the pulse generator.  
 $V_{EXT}$  = External voltage for measuring switching times.

Fig 5. Load circuit for switching times

Table 10. Test data

Supply voltage	Input		Load <sup>[2]</sup>		$V_{EXT}$		
$V_{CC(A)}, V_{CC(B)}$	$V_I$ <sup>[1]</sup>	$t_r = t_f$	$C_L$	$R_L$ <sup>[3]</sup>	$t_{PLH}, t_{PHL}$	$t_{PZH}, t_{PHZ}$	$t_{PZL}, t_{PLZ}$ <sup>[4]</sup>
1.1 V to 3.6 V	$V_{CCI}$	$\leq 3.0$ ns	5 pF, 10 pF, 15 pF and 30 pF	5 kΩ or 1 MΩ	open	GND	$2V_{CCO}$

- [1]  $V_{CCI}$  is the supply voltage associated with the data input port.
- [2] For measuring enable and disable times,  $C_L$  and  $R_L$  are connected to pin 2Y. Pin 1Y has no load.
- [3] For measuring enable and disable times  $R_L = 5$  kΩ, for measuring propagation delays  $R_L = 1$  MΩ.
- [4]  $V_{CCO}$  is the supply voltage associated with the output port.

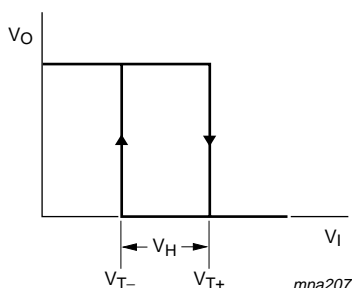
### 13. Transfer characteristics

**Table 11. Transfer characteristics**

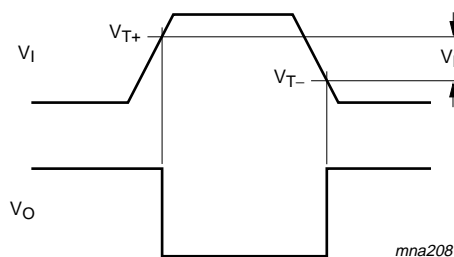
Voltages are referenced to GND (ground = 0 V; for test circuit see [Figure 5](#)).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		Unit
			Min	Typ	Max	Min	Max	
$V_{T+}$	positive-going threshold voltage	nOE inputs; see <a href="#">Figure 6</a> and <a href="#">Figure 7</a>						
		$V_{CC(A)} = 1.1 \text{ V}$	0.53	-	0.90	0.53	0.90	V
		$V_{CC(A)} = 1.4 \text{ V}$	0.74	-	1.11	0.74	1.11	V
		$V_{CC(A)} = 1.65 \text{ V}$	0.91	-	1.29	0.91	1.29	V
		$V_{CC(A)} = 2.3 \text{ V}$	1.37	-	1.77	1.37	1.77	V
		$V_{CC(A)} = 3.0 \text{ V}$	1.88	-	2.29	1.88	2.29	V
$V_{T-}$	negative-going threshold voltage	nOE inputs; see <a href="#">Figure 6</a> and <a href="#">Figure 7</a>						
		$V_{CC(A)} = 1.1 \text{ V}$	0.26	-	0.65	0.26	0.65	V
		$V_{CC(A)} = 1.4 \text{ V}$	0.39	-	0.75	0.39	0.75	V
		$V_{CC(A)} = 1.65 \text{ V}$	0.47	-	0.84	0.47	0.84	V
		$V_{CC(A)} = 2.3 \text{ V}$	0.69	-	1.04	0.69	1.04	V
		$V_{CC(A)} = 3.0 \text{ V}$	0.88	-	1.24	0.88	1.24	V
$V_H$	hysteresis voltage	nOE inputs; ( $V_{T+} - V_{T-}$ ); see <a href="#">Figure 6</a> , <a href="#">Figure 7</a> , <a href="#">Figure 8</a> and <a href="#">Figure 9</a>						
		$V_{CC(A)} = 1.1 \text{ V}$	0.08	-	0.46	0.08	0.46	V
		$V_{CC(A)} = 1.4 \text{ V}$	0.18	-	0.56	0.18	0.56	V
		$V_{CC(A)} = 1.65 \text{ V}$	0.27	-	0.66	0.27	0.66	V
		$V_{CC(A)} = 2.3 \text{ V}$	0.53	-	0.92	0.53	0.92	V
		$V_{CC(A)} = 3.0 \text{ V}$	0.79	-	1.31	0.79	1.31	V

### 14. Waveforms transfer characteristics



**Fig 6. Transfer characteristic**



$V_{T+}$  and  $V_{T-}$  limits at 70 % and 20 %.

**Fig 7. Definition of  $V_{T+}$ ,  $V_{T-}$  and  $V_H$**

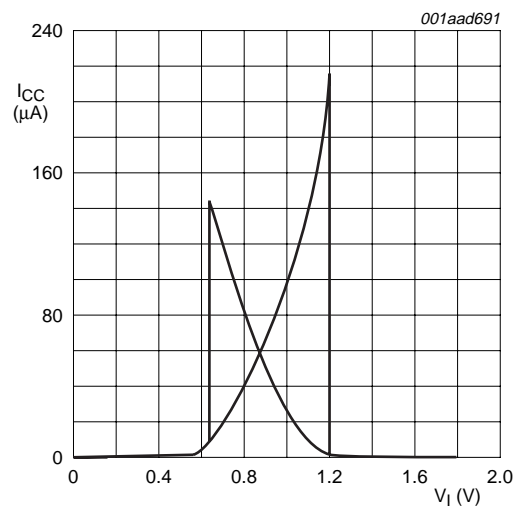


Fig 8. Typical transfer characteristics;  $V_{CC(A)} = 1.8\text{ V}$

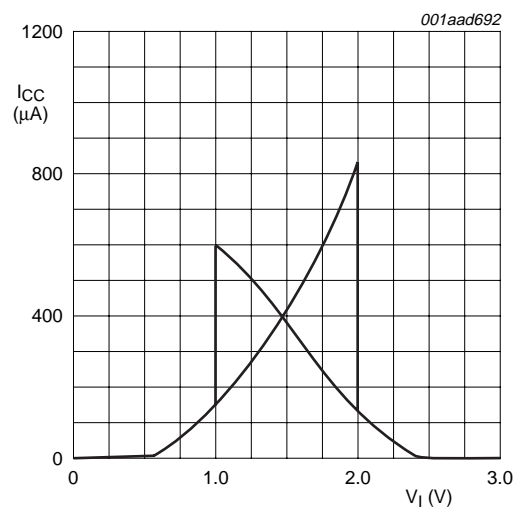


Fig 9. Typical transfer characteristics;  $V_{CC(A)} = 3.0\text{ V}$

15. Package outline

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

SOT833-1

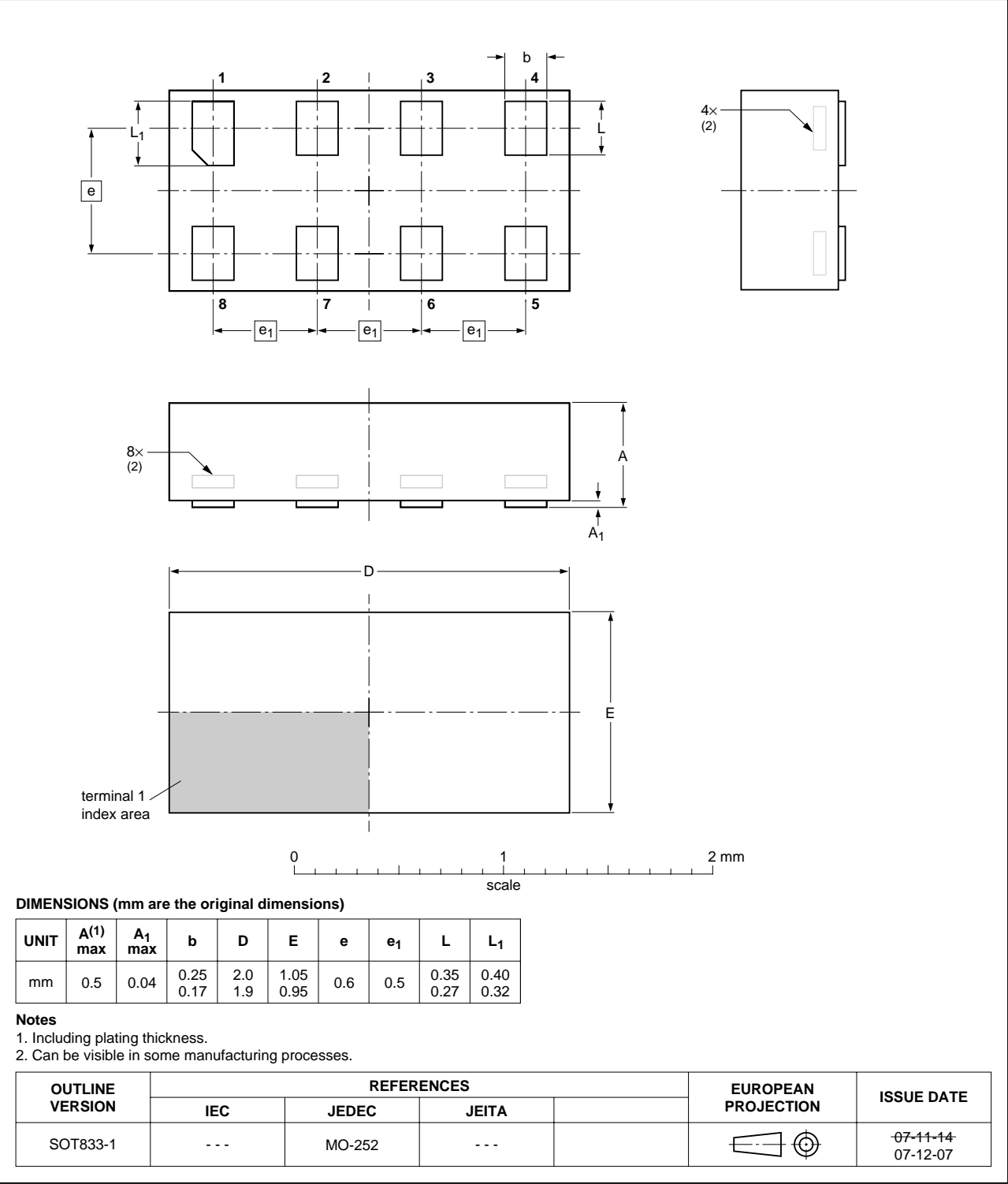


Fig 10. Package outline SOT833-1 (XSON8)

## 16. 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

## 17. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1T1326_1	20090120	Product data sheet	-	-

## 18. Legal information

### 18.1 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".

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