

# 74AUP1G125-Q100

Low-power buffer/line driver; 3-state

Rev. 1 — 20 March 2013

Product data sheet

## 1. General description

The 74AUP1G125-Q100 provides a single non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input ( $\overline{OE}$ ). A HIGH level at pin  $\overline{OE}$  causes the output to assume a high-impedance OFF-state. This device has the input-disable feature, which allows floating input signals. The inputs are disabled when the output enable input ( $\overline{OE}$ ) is HIGH.

Schmitt-trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire  $V_{CC}$  range from 0.8 V to 3.6 V. This device ensures a very low static and dynamic power consumption across the entire  $V_{CC}$  range from 0.8 V to 3.6 V.

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

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

## 2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - ◆ Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$
- 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:
  - ◆ MIL-STD-883, method 3015 Class 3A. Exceeds 5000 V
  - ◆ HBM JESD22-A114F Class 3A. Exceeds 5000 V
  - ◆ MM JESD22-A115-A exceeds 200 V ( $C = 200\text{ pF}$ ,  $R = 0\text{ }\Omega$ )
- Low static power consumption;  $I_{CC} = 0.9\text{ }\mu\text{A}$  (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot  $< 10\%$  of  $V_{CC}$
- Input-disable feature allows floating input conditions
- $I_{OFF}$  circuitry provides partial Power-down mode operation

### 3. Ordering information

Table 1. Ordering information

Type number	Package	Name	Description	Version
	Temperature range			
74AUP1G125GW-Q100	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1

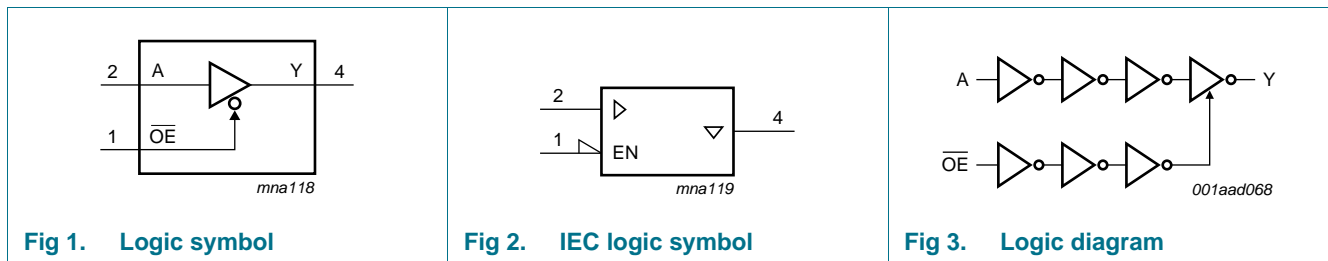
### 4. Marking

Table 2. Marking

Type number	Marking code <sup>[1]</sup>
74AUP1G125GW-Q100	pM

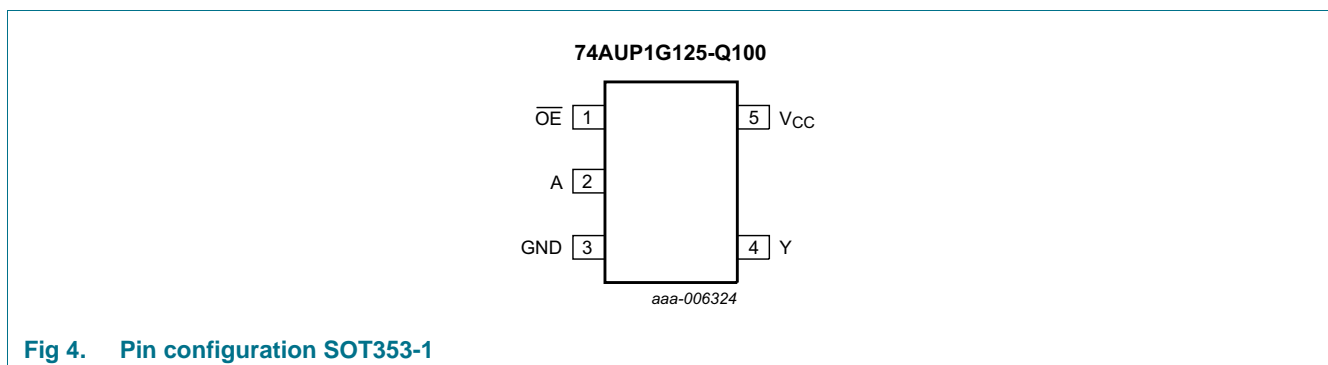
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

### 5. Functional diagram



### 6. Pinning information

#### 6.1 Pinning



## 6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
$\overline{OE}$	1	output enable input
A	2	data input
GND	3	ground (0 V)
Y	4	data output
$V_{CC}$	5	supply voltage

## 7. Functional description

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

Input		Output
$\overline{OE}$	A	Y
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
$V_{CC}$	supply voltage		-0.5	+4.6	V
$I_{IK}$	input clamping current	$V_I < 0$ V	-50	-	mA
$V_I$	input voltage		[1] -0.5	+4.6	V
$I_{OK}$	output clamping current	$V_O < 0$ V	-50	-	mA
$V_O$	output voltage	Active mode	[1] -0.5	$V_{CC} + 0.5$	V
		Power-down mode	[1] -0.5	+4.6	V
$I_O$	output current	$V_O = 0$ V to $V_{CC}$	-	$\pm 20$	mA
$I_{CC}$	supply current		-	+50	mA
$I_{GND}$	ground current		-50	-	mA
$T_{stg}$	storage temperature		-65	+150	°C
$P_{tot}$	total power dissipation	$T_{amb} = -40$ °C to +125 °C	[2] -	250	mW

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

## 9. Recommended operating conditions

**Table 6.** Recommended operating conditions

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

## 10. Static characteristics

**Table 7.** Static characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = 25</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	$0.75 \times V_{CC}$	-	-	V
		$I_O = -1.7$ mA; $V_{CC} = 1.4$ V	1.11	-	-	V
		$I_O = -1.9$ mA; $V_{CC} = 1.65$ V	1.32	-	-	V
		$I_O = -2.3$ mA; $V_{CC} = 2.3$ V	2.05	-	-	V
		$I_O = -3.1$ mA; $V_{CC} = 2.3$ 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
$V_{OL}$	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	-	-	0.31	V
		$I_O = 1.9$ mA; $V_{CC} = 1.65$ V	-	-	0.31	V
		$I_O = 2.3$ mA; $V_{CC} = 2.3$ V	-	-	0.31	V
		$I_O = 3.1$ mA; $V_{CC} = 2.3$ V	-	-	0.44	V
		$I_O = 2.7$ mA; $V_{CC} = 3.0$ V	-	-	0.31	V
		$I_O = 4.0$ mA; $V_{CC} = 3.0$ V	-	-	0.44	V

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

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.1$	$\mu\text{A}$
$I_{OZ}$	OFF-state output current	$V_I = V_{IH} \text{ or } V_{IL}; V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.1$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.5	$\mu\text{A}$
$\Delta I_{CC}$	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]	-	40	$\mu\text{A}$
		$\overline{\text{OE}}$ input; $V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$	[1]	-	110	$\mu\text{A}$
		all inputs; $V_I = \text{GND to } 3.6 \text{ V}; \text{OE} = V_{CC}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	[2]	-	1	$\mu\text{A}$
$C_I$	input capacitance	$V_{CC} = 0 \text{ V to } 3.6 \text{ V}; V_I = \text{GND or } V_{CC}$	-	0.9	-	pF
$C_O$	output capacitance					
	output enabled	$V_O = \text{GND}; V_{CC} = 0 \text{ V}$	-	1.7	-	pF
	output disabled	$V_{CC} = 0 \text{ V to } 3.6 \text{ V}; V_O = \text{GND or } V_{CC}$	-	1.5	-	pF
<b><math>T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8 \text{ V}$	$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	$0.65 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	-	-	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.0	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8 \text{ V}$	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	-	-	$0.35 \times V_{CC}$	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	0.7	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	0.9	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = -20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	$V_{CC} - 0.1$	-	-	V
		$I_O = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	$0.7 \times V_{CC}$	-	-	V
		$I_O = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	1.03	-	-	V
		$I_O = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.30	-	-	V
		$I_O = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.97	-	-	V
		$I_O = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.85	-	-	V
		$I_O = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.67	-	-	V
$I_O = -4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.55	-	-	V		

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

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3 × V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.37	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.35	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.33	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.45	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.33	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.45	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.5	μA
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	-	-	±0.5	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	-	-	±0.5	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	-	-	±0.6	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	-	-	0.9	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
		$\overline{\text{OE}}$ 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; $\overline{\text{OE}}$ = V <sub>CC</sub> ; V <sub>CC</sub> = 0.8 V to 3.6 V	[2]	-	1	μA
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 0.8 V	0.75 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	0.70 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	-	-	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 0.8 V	-	-	0.25 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.30 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	0.9	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.11	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.6 × V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	0.93	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.17	-	-	V
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	1.77	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.67	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.40	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.30	-	-	V

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

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.11	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.33 × V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.41	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.39	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.36	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.50	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.36	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.50	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.75	μA
I <sub>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	-	-	±0.75	μA
I <sub>OFF</sub>	power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V	-	-	±0.75	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V	-	-	±0.75	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	1.4	μA
ΔI <sub>CC</sub>	additional supply current	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
		$\overline{\text{OE}}$ 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]	-	180	μA
		all inputs; V <sub>I</sub> = GND to 3.6 V; $\overline{\text{OE}}$ = V <sub>CC</sub> ; V <sub>CC</sub> = 0.8 V to 3.6 V	[2]	-	1	μA

[1] One input at V<sub>CC</sub> - 0.6 V, other input at V<sub>CC</sub> or GND.[2] To show I<sub>CC</sub> remains very low when the input-disable feature is enabled.

## 11. Dynamic characteristics

**Table 8.** Dynamic characteristicsVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 7](#)

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 5 pF</b>						
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 5</a>	[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 <sub>CC</sub> = 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

**Table 8. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 7](#)

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
t <sub>en</sub>	enable time	$\overline{OE}$ to Y; see <a href="#">Figure 6</a>				
				<sup>[3]</sup>		
		V <sub>CC</sub> = 0.8 V	-	69.9	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.1	6.1	11.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.5	4.2	6.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	3.4	5.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.8	2.6	3.7	ns
t <sub>dis</sub>	disable time	$\overline{OE}$ to Y; see <a href="#">Figure 6</a>				
				<sup>[4]</sup>		
		V <sub>CC</sub> = 0.8 V	-	14.3	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.7	4.3	6.5	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	2.0	3.0	4.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.4	2.2	2.9	ns
	V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	2.5	3.2	ns	
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 10 pF</b>						
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 5</a>				
				<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 <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.2	4.2	ns
t <sub>en</sub>	enable time	$\overline{OE}$ to Y; see <a href="#">Figure 6</a>				
				<sup>[3]</sup>		
		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	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.3	4.8	7.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	3.9	5.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.8	3.2	4.3	ns
t <sub>dis</sub>	disable time	$\overline{OE}$ to Y; see <a href="#">Figure 6</a>				
				<sup>[4]</sup>		
		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	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.1	5.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.2	4.2	5.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	3.0	3.8	ns
	V <sub>CC</sub> = 3.0 V to 3.6 V	2.1	3.8	4.8	ns	



**Table 8. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 7](#)

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 15 pF</b>						
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 5</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	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	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</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	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.3	8.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	4.4	6.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.6	5.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.5	4.5	ns
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a>				
		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	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	5.0	6.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	5.3	6.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.1	3.8	4.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.9	5.0	6.2	ns
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 30 pF</b>						
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 5</a>				
		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	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	6.7	10.8	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.9	5.6	8.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.7	4.8	6.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	4.6	5.8	ns
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a>				
		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	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	4.0	6.8	10.8	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	5.6	8.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.7	4.8	6.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	4.6	6.0	ns

**Table 8. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 7](#)

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
$t_{dis}$	disable time	$\overline{OE}$ to Y; see <a href="#">Figure 6</a>	[4]			
		$V_{CC} = 0.8\text{ V}$	-	49.9	-	ns
		$V_{CC} = 1.1\text{ V to }1.3\text{ V}$	6.0	9.9	13.3	ns
		$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	4.4	7.7	9.6	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	5.1	8.7	11.1	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	3.6	6.2	7.4	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	5.2	8.7	10.5	ns

 $T_{amb} = 25\text{ }^{\circ}\text{C}$ 

$C_{PD}$	power dissipation capacitance	$f = 1\text{ MHz}; V_I = \text{GND to }V_{CC}$	[5]			
		output enabled				
		$V_{CC} = 0.8\text{ V}$	-	2.7	-	pF
		$V_{CC} = 1.1\text{ V to }1.3\text{ V}$	-	2.8	-	pF
		$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	-	2.9	-	pF
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	3.0	-	pF
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	3.6	-	pF
$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	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  $t_{PZL}$ .[4]  $t_{dis}$  is the same as  $t_{PHZ}$  and  $t_{PLZ}$ .[5]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ). $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where: $f_i$  = input frequency in MHz; $f_o$  = output frequency in MHz; $C_L$  = output load capacitance in pF; $V_{CC}$  = supply voltage in V;

N = number of inputs switching;

 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.**Table 9. Dynamic characteristics**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 7](#)

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
$C_L = 5\text{ pF}$							
$t_{pd}$	propagation delay	A to Y; see <a href="#">Figure 5</a>	[1]				
		$V_{CC} = 1.1\text{ V to }1.3\text{ V}$	2.5	11.7	2.5	12.9	ns
		$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	2.0	7.3	2.0	8.1	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.7	6.1	1.7	6.7	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	4.3	1.4	4.9	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.2	3.9	1.2	4.4	ns

**Table 9. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 7](#)

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a> <sup>[2]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.9	13.9	2.9	15.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.3	7.7	2.3	8.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	6.2	2.0	6.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	4.5	1.7	5.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	3.5	1.7	3.9	ns
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a> <sup>[3]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.7	7.3	2.7	8.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	5.1	2.1	5.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	5.0	2.0	5.7	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.4	3.3	1.4	4.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	3.4	1.7	3.9	ns

**C<sub>L</sub> = 10 pF**

t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 5</a> <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 <sub>CC</sub> = 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	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a> <sup>[2]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.4	15.8	3.4	17.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	8.6	2.2	9.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	6.8	1.9	7.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	5.3	1.7	5.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	4.3	1.7	4.8	ns
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a> <sup>[3]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.4	8.8	3.4	9.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	6.2	2.2	7.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	6.3	1.9	7.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	4.5	1.7	5.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	5.0	1.7	5.6	ns

**C<sub>L</sub> = 15 pF**

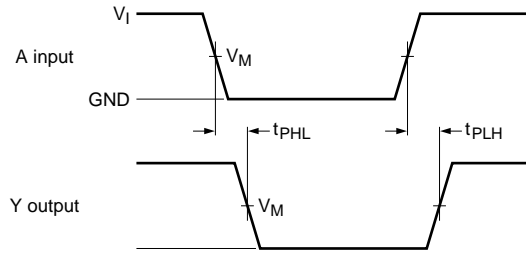
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 5</a> <sup>[1]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.3	15.8	3.3	17.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.5	9.8	2.5	10.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	7.9	2.0	8.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.8	6.0	1.8	6.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.8	5.4	1.8	6.1	ns

**Table 9. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 7](#)

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a> <sup>[2]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.7	17.6	3.7	19.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.5	9.8	2.5	10.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	7.7	2.1	8.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	6.1	2.0	6.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.9	4.9	1.9	5.5	ns
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a> <sup>[3]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.7	10.3	3.7	11.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.5	7.4	2.5	8.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	7.4	2.1	8.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	5.1	2.0	6.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.9	6.6	1.9	7.4	ns
<b>C<sub>L</sub> = 30 pF</b>							
t <sub>pd</sub>	propagation delay	A to Y; see <a href="#">Figure 5</a> <sup>[1]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.4	21.6	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 <sub>CC</sub> = 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	7.5	2.5	8.3	ns
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a> <sup>[2]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.8	22.8	4.8	25.3	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.1	12.6	3.1	14.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.8	10.2	2.8	11.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.6	7.8	2.6	8.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.6	6.9	2.6	7.7	ns
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Y; see <a href="#">Figure 6</a> <sup>[3]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.8	14.8	4.8	16.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.1	10.7	3.1	12.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.8	12.4	2.8	13.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.6	8.6	2.6	9.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.6	10.8	2.6	13.1	ns

[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.[2] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.[3] t<sub>dis</sub> is the same as t<sub>PHZ</sub> and t<sub>PLZ</sub>.

12. Waveforms

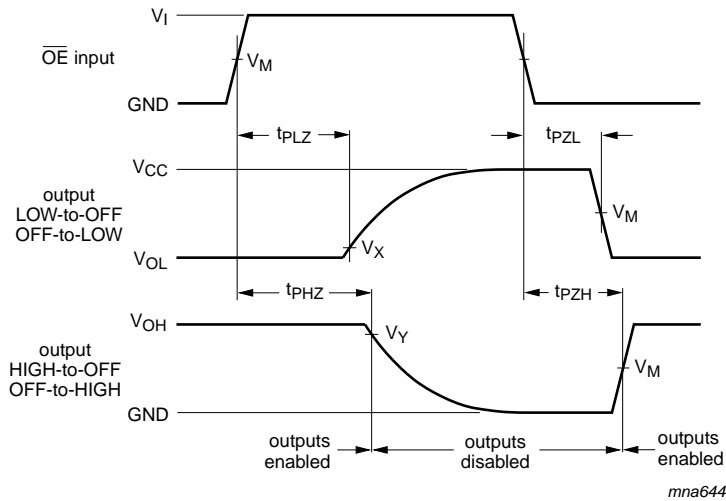


001aad070

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

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

Fig 5. The data input (A) to output (Y) propagation delays



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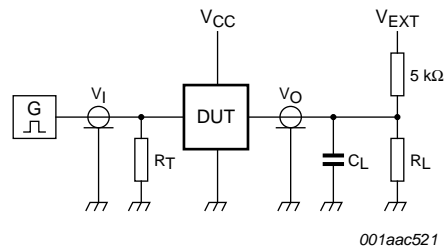
Measurement points are given in [Table 10](#).

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

Fig 6. Enable and disable times

Table 10. Measurement points

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



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

Definitions for test circuit:

$R_L$  = Load resistance.

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

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

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

**Fig 7. Test circuit for measuring switching times**

**Table 11. Test data**

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

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

13. Package outline

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

SOT353-1

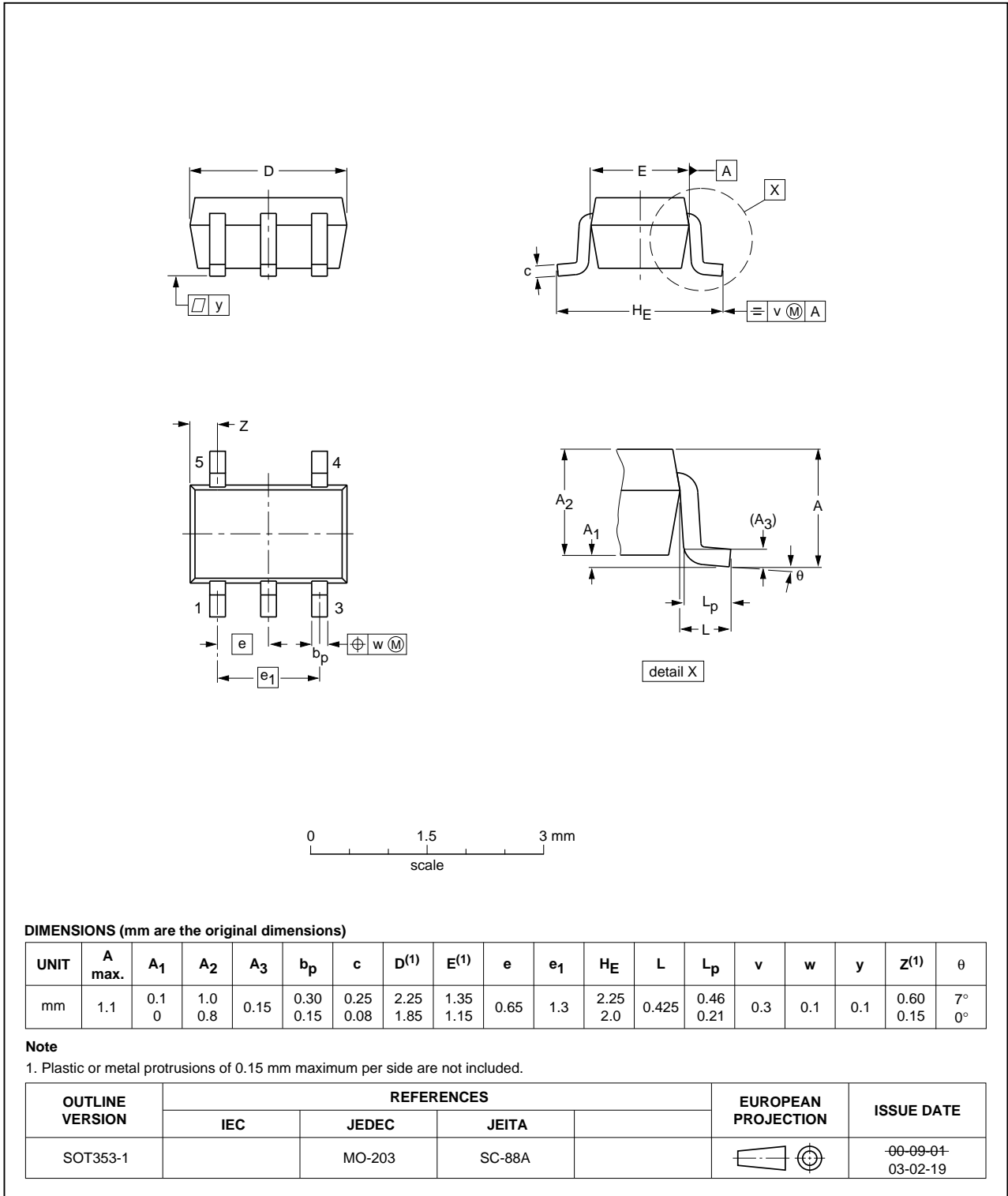


Fig 8. Package outline SOT353-1 (TSSOP5)

## 14. Abbreviations

Table 12. Abbreviations

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

## 15. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1G125_Q100 v.1	20130320	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.nexperia.com>.

### 16.2 Definitions

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## 17. Contact information

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For more information, please visit: <http://www.nexperia.com>

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