74AUP1G125

Low-power buffer/line driver; 3-state

Rev. 02 — 30 June 2006 | Product data sheet

1. General description

The 74AUP1G125 is a high-performance, low-power, low-voltage, Si-gate CMOS device, superior to most advanced CMOS compatible TTL families. Schmitt-trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire V_{CC} range from 0.8 V to 3.6 V. This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8 V to 3.6 V.

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

The 74AUP1G125 provides the 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 $\overline{OE}$ is HIGH.

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-A114-C Class 3A. Exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101-C exceeds 1000 V
- Low static power consumption; I_{CC} = 0.9 μA (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot < 10 % of V_{CC}
- Input-disable feature allows floating input conditions
- I_{OFF} circuitry provides partial Power-down mode operation
- Multiple package options
- Specified from –40 °C to +85 °C and –40 °C to +125 °C

PHILIPS

3. Ordering information

Table 1: Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74AUP1G125GW	–40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74AUP1G125GM	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
74AUP1G125GF	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm	SOT891

4. Marking

Table 2: Marking

Type number	Marking code
74AUP1G125GW	pM
74AUP1G125GM	pM
74AUP1G125GF	pM

5. Functional diagram

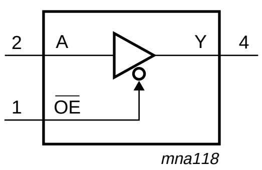


Fig 1. Logic symbol

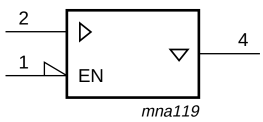


Fig 2. IEC logic symbol

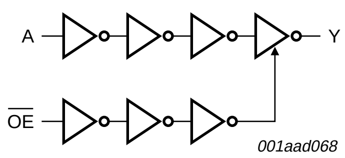


Fig 3. Logic diagram

6. Pinning information

6.1 Pinning

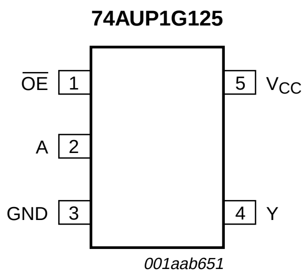
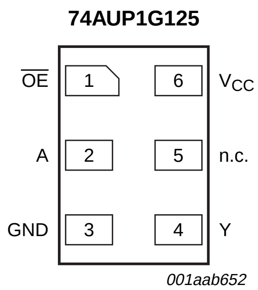
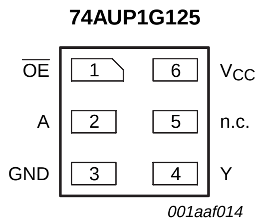


Fig 4. Pin configuration SOT353-1 (TSSOP5)



Transparent top view

Fig 5. Pin configuration SOT886 (XSON6)



Transparent top view

Fig 6. Pin configuration SOT891 (XSON6)

6.2 Pin description

Table 3: Pin description

Symbol	Pin		Description
	TSSOP5	XSON6	
$\overline{OE}$	1	1	output enable input
A	2	2	data input
GND	3	3	ground (0 V)
Y	4	4	data output
n.c.	-	5	not connected
V_{CC}	5	6	supply voltage

7. Functional description

Table 4: Function table[1]

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	$V_O > V_{CC}$ or $V_O < 0$ 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}		-	±20	mA
I_{CC}	supply current			-	+50	mA
I_{GND}	ground current			-	–50	mA
T_{stg}	storage temperature			–65	+150	°C
P_{tot}	total power dissipation	T_{amb} = –40 °C to +125 °C	[2]	-	250	mW

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

[2] For TSSOP5 packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.
For XSON6 packages: 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}	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
T_{amb} = 25 °C						
V_{IH}	HIGH-state input voltage	V_{CC} = 0.8 V	0.70 × V_{CC}	-	-	V
		V_{CC} = 0.9 V to 1.95 V	0.65 × 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-state input voltage	V_{CC} = 0.8 V	-	-	0.30 × V_{CC}	V
		V_{CC} = 0.9 V to 1.95 V	-	-	0.35 × 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-state output voltage	V_I = V_{IH} or V_{IL}				
		I_O = −20 μA; 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 × 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-state output voltage	V_I = V_{IH} or V_{IL}				
		I_O = 20 μA; V_{CC} = 0.8 V to 3.6 V	-	-	0.1	V
		I_O = 1.1 mA; V_{CC} = 1.1 V	-	-	0.3 × 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
I_I	input leakage current	V_I = GND to 3.6 V; V_{CC} = 0 V to 3.6 V	-	-	±0.1	μA
I_{OZ}	3-state output OFF-state current	V_I = V_{IH} or V_{IL}; V_O = 0 V to 3.6 V; V_{CC} = 0 V to 3.6 V	-	-	±0.1	μA
I_{OFF}	power-off leakage current	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V	-	-	±0.2	μA
ΔI_{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	-	-	±0.2	μA
I_{CC}	supply current	V_I = GND or V_{CC}; I_O = 0 A; V_{CC} = 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
ΔI_{CC}	additional supply current	data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	-	40	µA
		$\overline{OE}$ input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	-	110	µA
		all inputs; V_I = GND to 3.6 V; $\overline{OE} = V_{CC}$; $V_{CC} = 0.8$ V to 3.6 V	[2]	-	-	1	µA
C_I	input capacitance	$V_{CC} = 0$ V to 3.6 V; V_I = GND or V_{CC}		-	0.9	-	pF
C_O	output capacitance						
	output enabled	V_O = GND; $V_{CC} = 0$ V		-	1.7	-	pF
	output disabled	$V_{CC} = 0$ V to 3.6 V; V_O = GND or V_{CC}		-	1.5	-	pF
T_{amb} = –40 °C to +85 °C							
V_{IH}	HIGH-state 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-state 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-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		$I_O = -20$ µA; $V_{CC} = 0.8$ 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
		$I_O = -4.0$ mA; $V_{CC} = 3.0$ V		2.55	-	-	V
V_{OL}	LOW-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		$I_O = 20$ µA; $V_{CC} = 0.8$ 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
		$I_O = 4.0$ mA; $V_{CC} = 3.0$ V		-	-	0.45	V
I_I	input leakage current	V_I = GND to 3.6 V; $V_{CC} = 0$ V to 3.6 V		-	-	±0.5	µA
I_{OZ}	3-state output OFF-state current	$V_I = V_{IH}$ or V_{IL}; $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 3.6 V		-	-	±0.5	µA
I_{OFF}	power-off leakage current	V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ 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
ΔI_{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		-	-	±0.6	μA
I_{CC}	supply current	V_I = GND or V_{CC}; I_O = 0 A; V_{CC} = 0.8 V to 3.6 V		-	-	0.9	μA
ΔI_{CC}	additional supply current	data input; $V_I = V_{CC} - 0.6$ V; I_O = 0 A; V_{CC} = 3.3 V	[1]	-	-	50	μA
		$\overline{OE}$ input; $V_I = V_{CC} - 0.6$ V; I_O = 0 A; V_{CC} = 3.3 V	[1]	-	-	120	μA
		all inputs; V_I = GND to 3.6 V; $\overline{OE} = V_{CC}$; V_{CC} = 0.8 V to 3.6 V	[2]	-	-	1	μA
T_{amb} = −40 °C to +125 °C							
V_{IH}	HIGH-state input voltage	V_{CC} = 0.8 V		$0.75 \times V_{CC}$	-	-	V
		V_{CC} = 0.9 V to 1.95 V		$0.70 \times V_{CC}$	-	-	V
		V_{CC} = 2.3 V to 2.7 V		1.6	-	-	V
		V_{CC} = 3.0 V to 3.6 V		2.0	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 0.8 V		-	-	$0.25 \times V_{CC}$	V
		V_{CC} = 0.9 V to 1.95 V		-	-	$0.30 \times V_{CC}$	V
		V_{CC} = 2.3 V to 2.7 V		-	-	0.7	V
		V_{CC} = 3.0 V to 3.6 V		-	-	0.9	V
V_{OH}	HIGH-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		I_O = −20 μA; V_{CC} = 0.8 V to 3.6 V		$V_{CC} - 0.11$	-	-	V
		I_O = −1.1 mA; V_{CC} = 1.1 V		$0.6 \times V_{CC}$	-	-	V
		I_O = −1.7 mA; V_{CC} = 1.4 V		0.93	-	-	V
		I_O = −1.9 mA; V_{CC} = 1.65 V		1.17	-	-	V
		I_O = −2.3 mA; V_{CC} = 2.3 V		1.77	-	-	V
		I_O = −3.1 mA; V_{CC} = 2.3 V		1.67	-	-	V
		I_O = −2.7 mA; V_{CC} = 3.0 V		2.40	-	-	V
		I_O = −4.0 mA; V_{CC} = 3.0 V		2.30	-	-	V
V_{OL}	LOW-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		I_O = 20 μA; V_{CC} = 0.8 V to 3.6 V		-	-	0.11	V
		I_O = 1.1 mA; V_{CC} = 1.1 V		-	-	$0.33 \times V_{CC}$	V
		I_O = 1.7 mA; V_{CC} = 1.4 V		-	-	0.41	V
		I_O = 1.9 mA; V_{CC} = 1.65 V		-	-	0.39	V
		I_O = 2.3 mA; V_{CC} = 2.3 V		-	-	0.36	V
		I_O = 3.1 mA; V_{CC} = 2.3 V		-	-	0.50	V
		I_O = 2.7 mA; V_{CC} = 3.0 V		-	-	0.36	V
		I_O = 4.0 mA; V_{CC} = 3.0 V		-	-	0.50	V
I_I	input leakage current	V_I = GND to 3.6 V; V_{CC} = 0 V to 3.6 V		-	-	±0.75	μA
I_{OZ}	3-state output OFF-state current	$V_I = V_{IH}$ or V_{IL}; V_O = 0 V to 3.6 V; V_{CC} = 0 V to 3.6 V		-	-	±0.75	μA
I_{OFF}	power-off leakage current	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V		-	-	±0.75	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
ΔI_{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		-	-	±0.75	µA
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	µA
ΔI_{CC}	additional supply current	data input; $V_I = V_{CC} - 0.6$ V; I_O = 0 A; V_{CC} = 3.3 V	[1]	-	-	75	µA
		$\overline{OE}$ input; $V_I = V_{CC} - 0.6$ V; I_O = 0 A; V_{CC} = 3.3 V	[1]	-	-	180	µA
		all inputs; V_I = GND to 3.6 V; $\overline{OE} = V_{CC}$; V_{CC} = 0.8 V to 3.6 V	[2]	-	-	1	µA

[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	Min	Typ [1]	Max	Unit
T_{amb} = 25 °C; C_L = 5 pF						
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay A to Y	see Figure 7				
		V_{CC} = 0.8 V	-	20.6	-	ns
		V_{CC} = 1.1 V to 1.3 V	2.8	5.5	10.5	ns
		V_{CC} = 1.4 V to 1.6 V	2.2	3.9	6.1	ns
		V_{CC} = 1.65 V to 1.95 V	1.9	3.2	4.8	ns
		V_{CC} = 2.3 V to 2.7 V	1.6	2.6	3.6	ns
		V_{CC} = 3.0 V to 3.6 V	1.4	2.4	3.1	ns
t_{PZH}, t_{PZL}	OFF-state to HIGH and OFF-state to LOW propagation delay $\overline{OE}$ to Y	see Figure 8				
		V_{CC} = 0.8 V	-	69.9	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.1	6.1	11.8	ns
		V_{CC} = 1.4 V to 1.6 V	2.5	4.2	6.6	ns
		V_{CC} = 1.65 V to 1.95 V	2.1	3.4	5.1	ns
		V_{CC} = 2.3 V to 2.7 V	1.8	2.6	3.7	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	2.4	3.1	ns
t_{PHZ}, t_{PLZ}	HIGH to OFF-state and LOW to OFF-state propagation delay $\overline{OE}$ to Y	see Figure 8				
		V_{CC} = 0.8 V	-	14.3	-	ns
		V_{CC} = 1.1 V to 1.3 V	2.7	4.3	6.5	ns
		V_{CC} = 1.4 V to 1.6 V	2.1	3.2	4.4	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	3.0	4.3	ns
		V_{CC} = 2.3 V to 2.7 V	1.4	2.2	2.9	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	2.5	3.2	ns

Table 8: Dynamic characteristics *...continued*

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 9

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
T_{amb} = 25 °C; C_L = 10 pF						
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay A to Y	see Figure 7				
		V_{CC} = 0.8 V	-	24.0	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.2	6.4	12.3	ns
		V_{CC} = 1.4 V to 1.6 V	2.1	4.5	7.3	ns
		V_{CC} = 1.65 V to 1.95 V	1.9	3.8	5.5	ns
		V_{CC} = 2.3 V to 2.7 V	2.1	3.2	4.2	ns
		V_{CC} = 3.0 V to 3.6 V	1.8	3.0	3.8	ns
t_{PZH}, t_{PZL}	OFF-state to HIGH and OFF-state to LOW propagation delay $\overline{OE}$ to Y	see Figure 8				
		V_{CC} = 0.8 V	-	73.7	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.6	6.9	13.5	ns
		V_{CC} = 1.4 V to 1.6 V	2.3	4.8	7.7	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	3.9	5.8	ns
		V_{CC} = 2.3 V to 2.7 V	1.8	3.2	4.3	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	3.0	3.9	ns
t_{PHZ}, t_{PLZ}	HIGH to OFF-state and LOW to OFF-state propagation delay $\overline{OE}$ to Y	see Figure 8				
		V_{CC} = 0.8 V	-	32.7	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.4	5.4	7.9	ns
		V_{CC} = 1.4 V to 1.6 V	2.2	4.1	5.5	ns
		V_{CC} = 1.65 V to 1.95 V	2.2	4.2	5.6	ns
		V_{CC} = 2.3 V to 2.7 V	1.7	3.0	3.8	ns
		V_{CC} = 3.0 V to 3.6 V	2.1	3.8	4.8	ns
T_{amb} = 25 °C; C_L = 15 pF						
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay A to Y	see Figure 7				
		V_{CC} = 0.8 V	-	27.4	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.6	7.2	14.1	ns
		V_{CC} = 1.4 V to 1.6 V	3.0	5.1	8.1	ns
		V_{CC} = 1.65 V to 1.95 V	2.2	4.3	6.3	ns
		V_{CC} = 2.3 V to 2.7 V	2.0	3.7	4.9	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	3.5	4.4	ns
t_{PZH}, t_{PZL}	OFF-state to HIGH and OFF-state to LOW propagation delay $\overline{OE}$ to Y	see Figure 8				
		V_{CC} = 0.8 V	-	77.5	-	ns
		V_{CC} = 1.1 V to 1.3 V	4.0	7.7	15.2	ns
		V_{CC} = 1.4 V to 1.6 V	3.0	5.3	8.4	ns
		V_{CC} = 1.65 V to 1.95 V	2.3	4.4	6.5	ns
		V_{CC} = 2.3 V to 2.7 V	2.1	3.6	5.0	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	3.5	4.5	ns

Table 8: Dynamic characteristics *…continued*

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 9

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
t_{PHZ}, t_{PLZ}	HIGH to OFF-state and LOW to OFF-state propagation delay $\overline{OE}$ to Y	see Figure 8				
		V_{CC} = 0.8 V	-	60.8	-	ns
		V_{CC} = 1.1 V to 1.3 V	4.3	6.5	9.2	ns
		V_{CC} = 1.4 V to 1.6 V	3.0	5.0	6.5	ns
		V_{CC} = 1.65 V to 1.95 V	3.0	5.3	6.6	ns
		V_{CC} = 2.3 V to 2.7 V	2.1	3.8	4.9	ns
		V_{CC} = 3.0 V to 3.6 V	2.9	5.0	6.2	ns
T_{amb} = 25 °C; C_L = 30 pF						
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay A to Y	see Figure 7				
		V_{CC} = 0.8 V	-	37.4	-	ns
		V_{CC} = 1.1 V to 1.3 V	4.8	9.5	19.0	ns
		V_{CC} = 1.4 V to 1.6 V	4.0	6.7	10.8	ns
		V_{CC} = 1.65 V to 1.95 V	2.9	5.6	8.4	ns
		V_{CC} = 2.3 V to 2.7 V	2.7	4.8	6.3	ns
		V_{CC} = 3.0 V to 3.6 V	2.7	4.6	5.8	ns
t_{PZH}, t_{PZL}	OFF-state to HIGH and OFF-state to LOW propagation delay $\overline{OE}$ to Y	see Figure 8				
		V_{CC} = 0.8 V	-	88.9	-	ns
		V_{CC} = 1.1 V to 1.3 V	5.2	9.9	19.8	ns
		V_{CC} = 1.4 V to 1.6 V	4.0	6.8	10.8	ns
		V_{CC} = 1.65 V to 1.95 V	3.0	5.6	8.5	ns
		V_{CC} = 2.3 V to 2.7 V	2.7	4.8	6.5	ns
		V_{CC} = 3.0 V to 3.6 V	2.7	4.6	6.0	ns
t_{PHZ}, t_{PLZ}	HIGH to OFF-state and LOW to OFF-state propagation delay $\overline{OE}$ to Y	see Figure 8				
		V_{CC} = 0.8 V	-	49.9	-	ns
		V_{CC} = 1.1 V to 1.3 V	6.0	9.9	13.3	ns
		V_{CC} = 1.4 V to 1.6 V	4.4	7.7	9.6	ns
		V_{CC} = 1.65 V to 1.95 V	5.1	8.7	11.1	ns
		V_{CC} = 2.3 V to 2.7 V	3.6	6.2	7.4	ns
		V_{CC} = 3.0 V to 3.6 V	5.2	8.7	10.5	ns

Table 8: Dynamic characteristics *…continued*

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 9

Symbol	Parameter	Conditions		Min	Typ [1]	Max	Unit
T_{amb} = 25 °C							
C_{PD}	power dissipation capacitance	f = 1 MHz; V_I = GND to V_{CC}	[2]				
		output enabled					
		V_{CC} = 0.8 V		-	2.7	-	pF
		V_{CC} = 1.1 V to 1.3 V		-	2.8	-	pF
		V_{CC} = 1.4 V to 1.6 V		-	2.9	-	pF
		V_{CC} = 1.65 V to 1.95 V		-	3.0	-	pF
		V_{CC} = 2.3 V to 2.7 V		-	3.6	-	pF
		V_{CC} = 3.0 V to 3.6 V		-	4.2	-	pF

[1] All typical values are measured at nominal V_{CC}.

[2] C_{PD} is used to determine the dynamic power dissipation (P_D 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_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 9

Symbol	Parameter	Conditions	–40 °C to +85 °C		–40 °C to +125 °C		Unit
			Min	Max	Min	Max	
C_L = 5 pF							
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay A to Y	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	2.5	11.7	2.5	12.9	ns
		V_{CC} = 1.4 V to 1.6 V	2.0	7.3	2.0	8.1	ns
		V_{CC} = 1.65 V to 1.95 V	1.7	6.1	1.7	6.7	ns
		V_{CC} = 2.3 V to 2.7 V	1.4	4.3	1.4	4.9	ns
		V_{CC} = 3.0 V to 3.6 V	1.2	3.9	1.2	4.4	ns
t_{PZH}, t_{PZL}	OFF-state to HIGH and OFF-state to LOW propagation delay $\overline{OE}$ to Y	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	2.9	13.9	2.9	15.4	ns
		V_{CC} = 1.4 V to 1.6 V	2.3	7.7	2.3	8.3	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	6.2	2.0	6.8	ns
		V_{CC} = 2.3 V to 2.7 V	1.7	4.5	1.7	5.0	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	3.5	1.7	3.9	ns
t_{PHZ}, t_{PLZ}	HIGH to OFF-state and LOW to OFF-state propagation delay $\overline{OE}$ to Y	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	2.7	7.3	2.7	8.2	ns
		V_{CC} = 1.4 V to 1.6 V	2.1	5.1	2.1	5.7	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	5.0	2.0	5.7	ns
		V_{CC} = 2.3 V to 2.7 V	1.4	3.3	1.4	4.1	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	3.4	1.7	3.9	ns

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

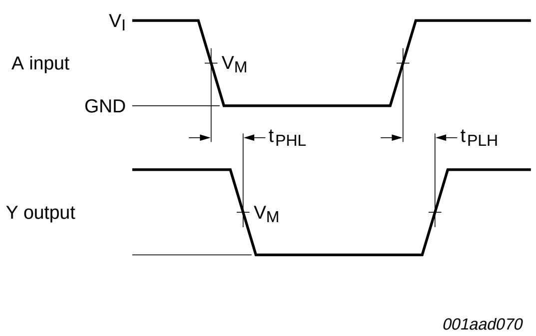
Symbol	Parameter	Conditions	–40 °C to +85 °C		–40 °C to +125 °C		Unit
			Min	Max	Min	Max	
C_L = 10 pF							
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay A to Y	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	3.0	13.8	3.0	15.2	ns
		V_{CC} = 1.4 V to 1.6 V	1.9	8.5	1.9	9.4	ns
		V_{CC} = 1.65 V to 1.95 V	1.7	6.8	1.7	7.6	ns
		V_{CC} = 2.3 V to 2.7 V	1.6	5.3	1.6	5.9	ns
		V_{CC} = 3.0 V to 3.6 V	1.6	4.6	1.6	5.2	ns
t_{PZH}, t_{PZL}	OFF-state to HIGH and OFF-state to LOW propagation delay $\overline{OE}$ to Y	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	3.4	15.8	3.4	17.5	ns
		V_{CC} = 1.4 V to 1.6 V	2.2	8.6	2.2	9.4	ns
		V_{CC} = 1.65 V to 1.95 V	1.9	6.8	1.9	7.4	ns
		V_{CC} = 2.3 V to 2.7 V	1.7	5.3	1.7	5.9	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	4.3	1.7	4.8	ns
t_{PHZ}, t_{PLZ}	HIGH to OFF-state and LOW to OFF-state propagation delay $\overline{OE}$ to Y	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	3.4	8.8	3.4	9.9	ns
		V_{CC} = 1.4 V to 1.6 V	2.2	6.2	2.2	7.1	ns
		V_{CC} = 1.65 V to 1.95 V	1.9	6.3	1.9	7.1	ns
		V_{CC} = 2.3 V to 2.7 V	1.7	4.5	1.7	5.1	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	5.0	1.7	5.6	ns
C_L = 15 pF							
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay A to Y	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	3.3	15.8	3.3	17.5	ns
		V_{CC} = 1.4 V to 1.6 V	2.5	9.8	2.5	10.9	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	7.9	2.0	8.8	ns
		V_{CC} = 2.3 V to 2.7 V	1.8	6.0	1.8	6.7	ns
		V_{CC} = 3.0 V to 3.6 V	1.8	5.4	1.8	6.1	ns
t_{PZH}, t_{PZL}	OFF-state to HIGH and OFF-state to LOW propagation delay $\overline{OE}$ to Y	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	3.7	17.6	3.7	19.6	ns
		V_{CC} = 1.4 V to 1.6 V	2.5	9.8	2.5	10.7	ns
		V_{CC} = 1.65 V to 1.95 V	2.1	7.7	2.1	8.5	ns
		V_{CC} = 2.3 V to 2.7 V	2.0	6.1	2.0	6.8	ns
		V_{CC} = 3.0 V to 3.6 V	1.9	4.9	1.9	5.5	ns
t_{PHZ}, t_{PLZ}	HIGH to OFF-state and LOW to OFF-state propagation delay $\overline{OE}$ to Y	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	3.7	10.3	3.7	11.6	ns
		V_{CC} = 1.4 V to 1.6 V	2.5	7.4	2.5	8.4	ns
		V_{CC} = 1.65 V to 1.95 V	2.1	7.4	2.1	8.9	ns
		V_{CC} = 2.3 V to 2.7 V	2.0	5.1	2.0	6.4	ns
		V_{CC} = 3.0 V to 3.6 V	1.9	6.6	1.9	7.4	ns

Table 9: Dynamic characteristics *...continued*

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 9

Symbol	Parameter	Conditions	−40 °C to +85 °C		−40 °C to +125 °C		Unit
			Min	Max	Min	Max	
C_L = 30 pF							
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay A to Y	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	4.4	21.6	4.4	24.0	ns
		V_{CC} = 1.4 V to 1.6 V	3.0	13.0	3.0	14.5	ns
		V_{CC} = 1.65 V to 1.95 V	2.6	10.3	2.6	11.5	ns
		V_{CC} = 2.3 V to 2.7 V	2.5	7.8	2.5	8.7	ns
		V_{CC} = 3.0 V to 3.6 V	2.5	7.5	2.5	8.3	ns
t_{PZH}, t_{PZL}	OFF-state to HIGH and OFF-state to LOW propagation delay $\overline{OE}$ to Y	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	4.8	22.8	4.8	25.3	ns
		V_{CC} = 1.4 V to 1.6 V	3.1	12.6	3.1	14.1	ns
		V_{CC} = 1.65 V to 1.95 V	2.8	10.2	2.8	11.3	ns
		V_{CC} = 2.3 V to 2.7 V	2.6	7.8	2.6	8.8	ns
		V_{CC} = 3.0 V to 3.6 V	2.6	6.9	2.6	7.7	ns
t_{PHZ}, t_{PLZ}	HIGH to OFF-state and LOW to OFF-state propagation delay $\overline{OE}$ to Y	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	4.8	14.8	4.8	16.5	ns
		V_{CC} = 1.4 V to 1.6 V	3.1	10.7	3.1	12.1	ns
		V_{CC} = 1.65 V to 1.95 V	2.8	12.4	2.8	13.8	ns
		V_{CC} = 2.3 V to 2.7 V	2.6	8.6	2.6	9.6	ns
		V_{CC} = 3.0 V to 3.6 V	2.6	10.8	2.6	13.1	ns

12. Waveforms



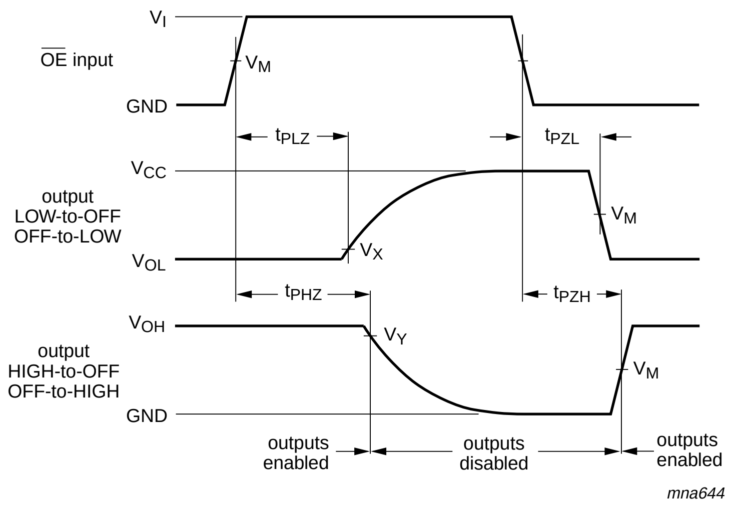
Measurement points are given in Table 10.

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

Fig 7. The data input (A) to output (Y) propagation delays

Table 10: Measurement points

Supply voltage	Output	Input		
V_{CC}	V_M	V_M	V_I	$t_r = t_f$
0.8 V to 3.6 V	0.5 × V_{CC}	0.5 × V_{CC}	V_{CC}	≤ 3.0 ns



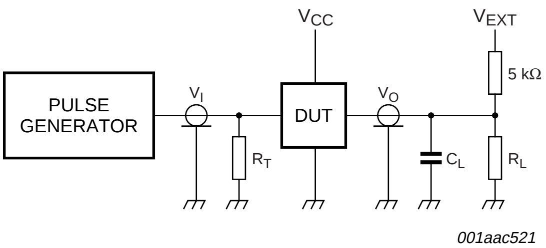
Measurement points are given in Table 11.

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

Fig 8. Turn-on and turn-off times

Table 11: Measurement points

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



Test data is given in Table 12.

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

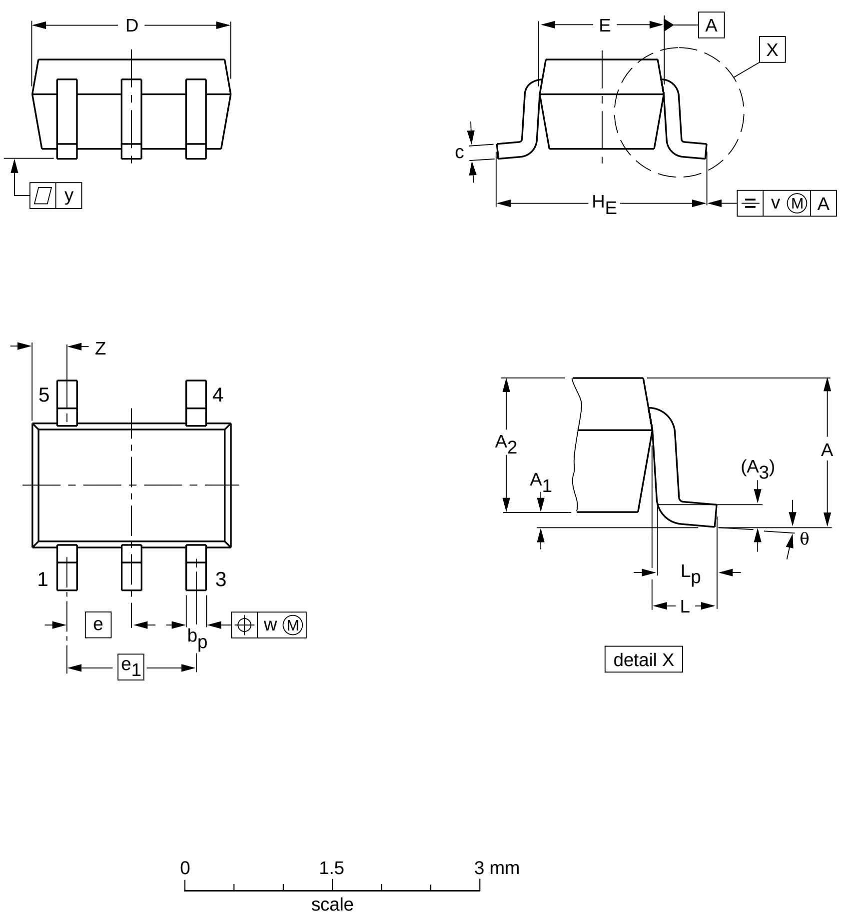
Table 12: Test data

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 kΩ, for measuring propagation delays, setup and hold times and pulse width R_L = 1 MΩ.

13. Package outline

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm **SOT353-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D(1)	E(1)	e	e_1	H_E	L	L_p	v	w	y	Z(1)	θ
mm	1.1	0.1 0	1.0 0.8	0.15	0.30 0.15	0.25 0.08	2.25 1.85	1.35 1.15	0.65	1.3	2.25 2.0	0.425	0.46 0.21	0.3	0.1	0.1	0.60 0.15	7° 0°

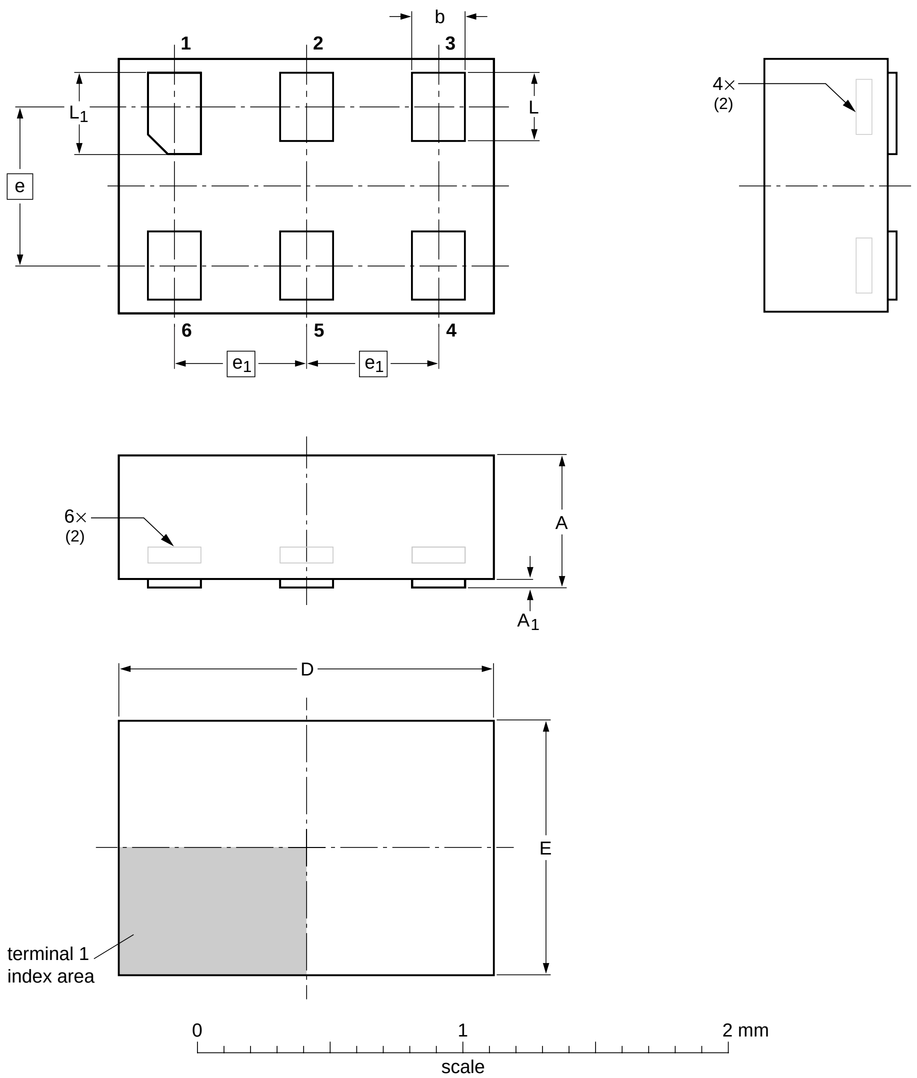
Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT353-1		MO-203	SC-88A			~~00-09-01~~ 03-02-19

Fig 10. Package outline SOT353-1 (TSSOP5)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm **SOT886**



DIMENSIONS (mm are the original dimensions)

UNIT	A(1) max	A_1 max	b	D	E	e	e_1	L	L_1
mm	0.5	0.04	0.25 0.17	1.5 1.4	1.05 0.95	0.6	0.5	0.35 0.27	0.40 0.32

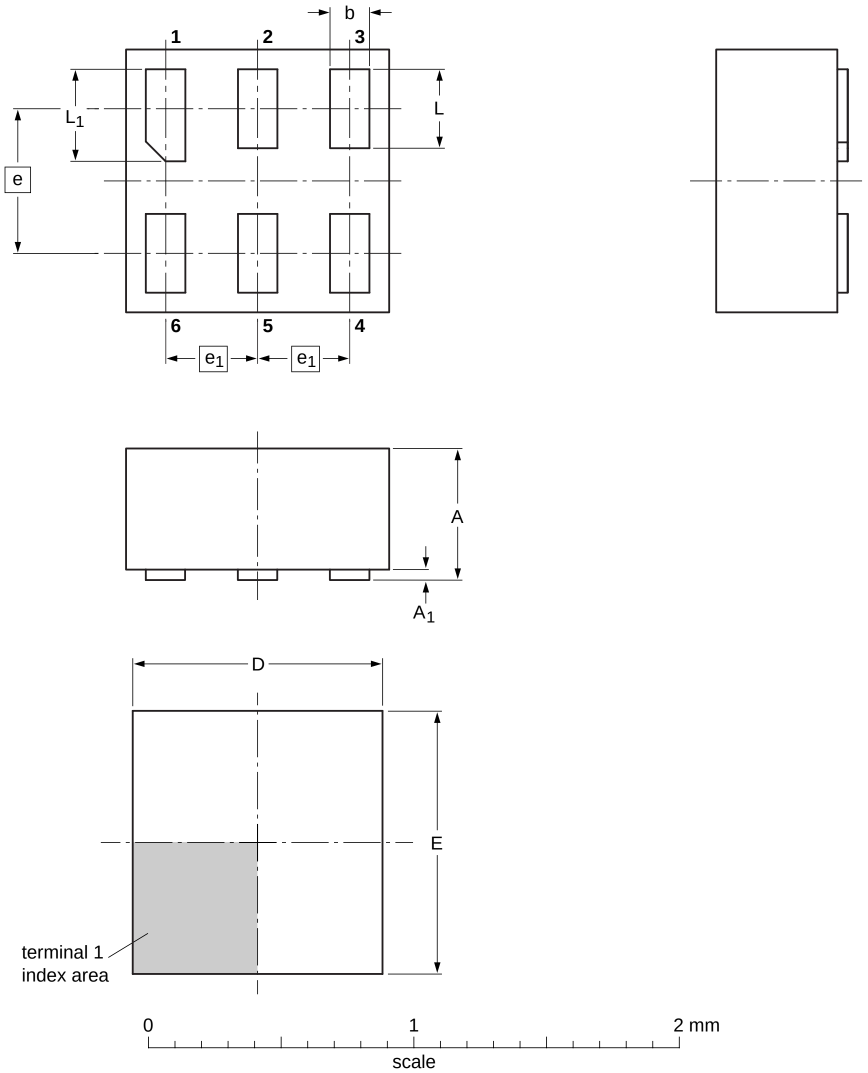
Notes

1. Including plating thickness.
2. Can be visible in some manufacturing processes.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT886		MO-252				~~04-07-15~~ 04-07-22

Fig 11. Package outline SOT886 (XSON6)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm **SOT891**



DIMENSIONS (mm are the original dimensions)

UNIT	A max	A_1 max	b	D	E	e	e_1	L	L_1
mm	0.5	0.04	0.20 0.12	1.05 0.95	1.05 0.95	0.55	0.35	0.35 0.27	0.40 0.32

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT891						~~05-03-11~~ 05-04-06

Fig 12. Package outline SOT891 (XSON6)

14. Abbreviations

Table 13: 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 14: Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1G125_2	20060630	Product data sheet	-	74AUP1G125_1
Modifications:	• ESD HBM and C_{PD} values modified in Section 2, Table 8 • Added type number 74AUP1G125GF (XSON6/SOT891) package			
74AUP1G125_1	20050718	Product data sheet	-	-

16. Legal information

16.1 Data sheet status

Document status[1][2]	Product status[3]	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.semiconductors.philips.com.

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