

Important notice

Dear Customer,

On 7 February 2017 the former NXP Standard Product business became a new company with the tradename **Nexperia**. Nexperia is an industry leading supplier of Discrete, Logic and PowerMOS semiconductors with its focus on the automotive, industrial, computing, consumer and wearable application markets

In data sheets and application notes which still contain NXP or Philips Semiconductors references, use the references to Nexperia, as shown below.

Instead of <http://www.nxp.com>, <http://www.philips.com/> or <http://www.semiconductors.philips.com/>, use **<http://www.nexperia.com>**

Instead of sales.addresses@www.nxp.com or sales.addresses@www.semiconductors.philips.com, use **salesaddresses@nexperia.com** (email)

Replace the copyright notice at the bottom of each page or elsewhere in the document, depending on the version, as shown below:

- © NXP N.V. (year). All rights reserved or © Koninklijke Philips Electronics N.V. (year). All rights reserved

Should be replaced with:

- © **Nexperia B.V. (year). All rights reserved.**

If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via **salesaddresses@nexperia.com**). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

74LVT16501A

3.3 V LVT 18-bit universal bus transceiver; 3-state

Rev. 04 — 19 May 2006

Product data sheet

1. General description

The 74LVT16501A is a high-performance BiCMOS product designed for V_{CC} operation at 3.3 V. This device is an 18-bit universal transceiver featuring non-inverting 3-state bus compatible outputs in both send and receive directions.

Data flow in each direction is controlled by output enable ($OEAB$ and $\overline{OEBA}$), latch enable ($LEAB$ and $LEBA$), and clock ($CPAB$ and $CPBA$) inputs.

For A-to-B data flow, the device operates in the transparent mode when $LEAB$ is HIGH. When $LEAB$ is LOW, the A-bus data is latched if $CPAB$ is held at a HIGH or LOW level. If $LEAB$ is LOW, the A-bus data is stored in the latch/flip-flop on the LOW-to-HIGH transition of $CPAB$. When $OEAB$ is HIGH, the outputs are active. When $OEAB$ is LOW, the outputs are in the high-impedance state.

Data flow for B-to-A is similar to that of A-to-B but uses $\overline{OEBA}$, $LEBA$ and $CPBA$. The output enables are complimentary ($OEAB$ is active HIGH and $\overline{OEBA}$ is active LOW).

Active bus hold circuitry is provided to hold unused or floating data inputs at a valid logic level.

2. Features

- 18-bit bidirectional bus interface
- 3-state buffers
- Output capability: +64 mA to -32 mA
- TTL input and output switching levels
- Input and output interface capability to systems at 5 V supply
- Bus hold data inputs eliminate need for external pull-up resistors to hold unused inputs
- Live insertion and extraction permitted
- Power-up reset
- Power-up 3-state
- No bus current loading when output is tied to 5 V bus
- Positive-edge triggered clock inputs
- Latch-up protection:
 - ◆ JESD78: exceeds 500 mA
- ESD protection:
 - ◆ MIL STD 883, method 3015: exceeds 2000 V
 - ◆ Machine model: exceeds 200 V

PHILIPS

3. Quick reference data

Table 1. Quick reference data

$GND = 0\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

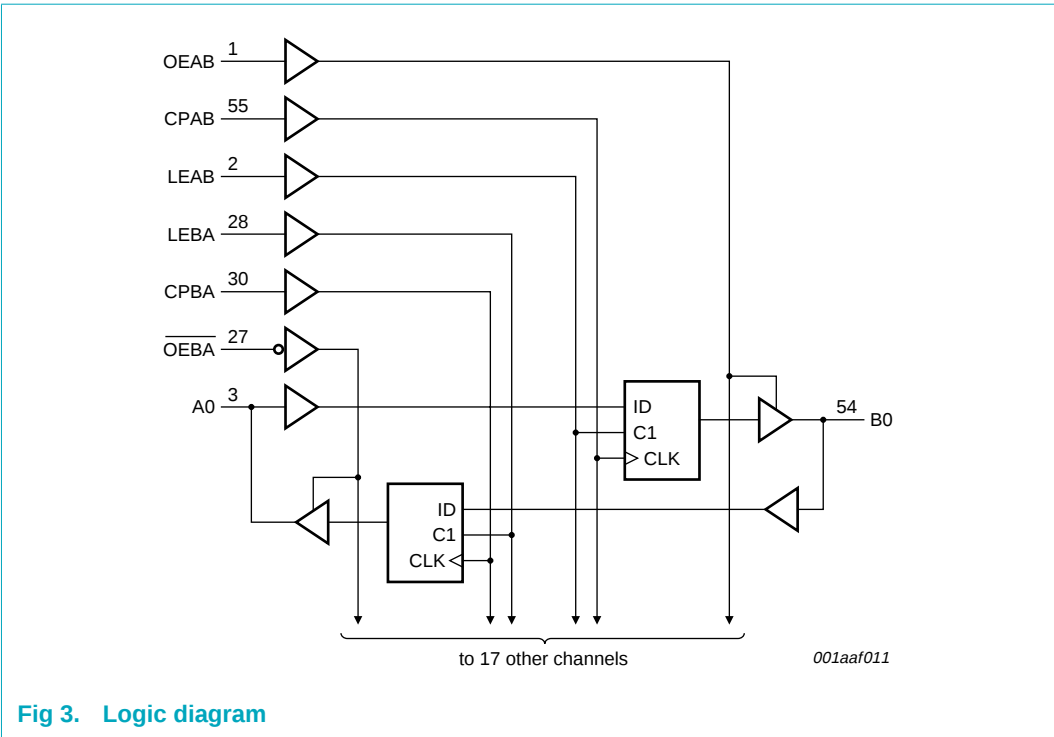
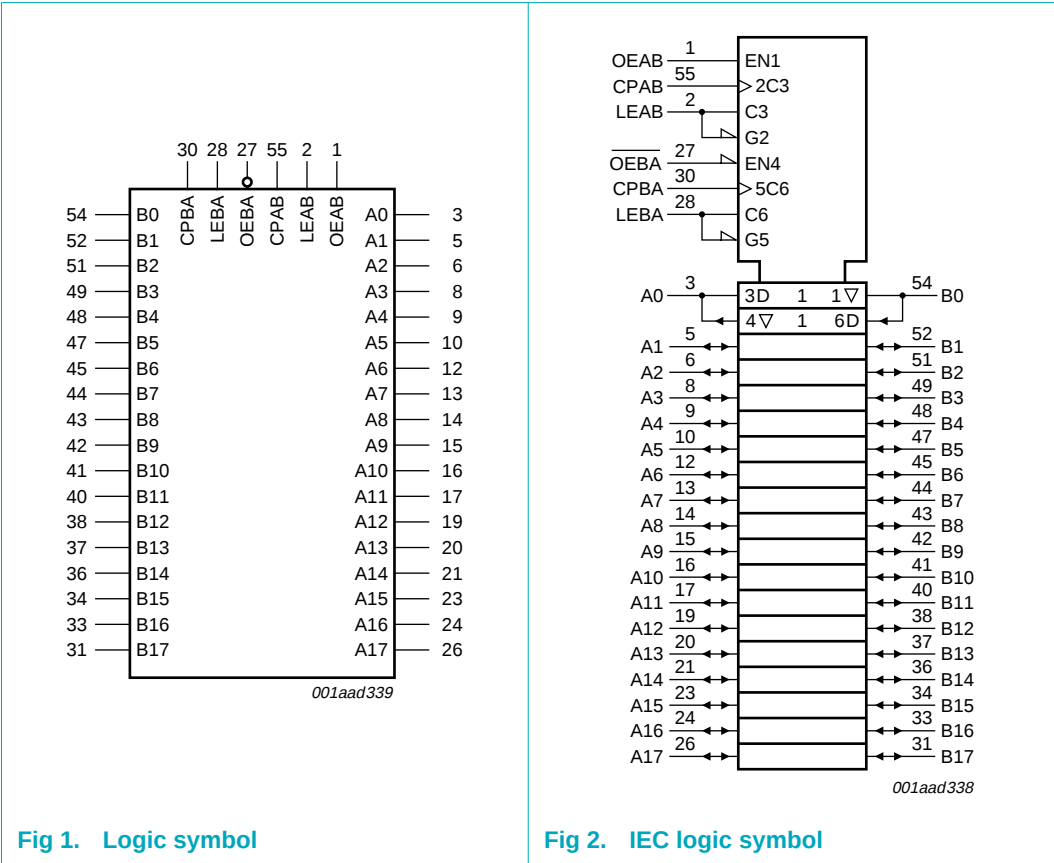
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PLH}	propagation delay An to Bn or Bn to An	$C_L = 50\text{ pF}$; $V_{CC} = 3.3\text{ V}$	-	1.9	-	ns
t_{PHL}	propagation delay An to Bn or Bn to An	$C_L = 50\text{ pF}$; $V_{CC} = 3.3\text{ V}$	-	1.9	-	ns
C_i	input capacitance (control pins)	$V_i = 0\text{ V}$ or 3.0 V	-	3	-	pF
C_{io}	input/output capacitance (I/O pins)	outputs disabled; $V_{IO} = 0\text{ V}$ or 3.0 V	-	9	-	pF
I_{CC}	quiescent supply current	outputs disabled; $V_{CC} = 3.6\text{ V}$	-	70	-	μA

4. Ordering information

Table 2. Ordering information

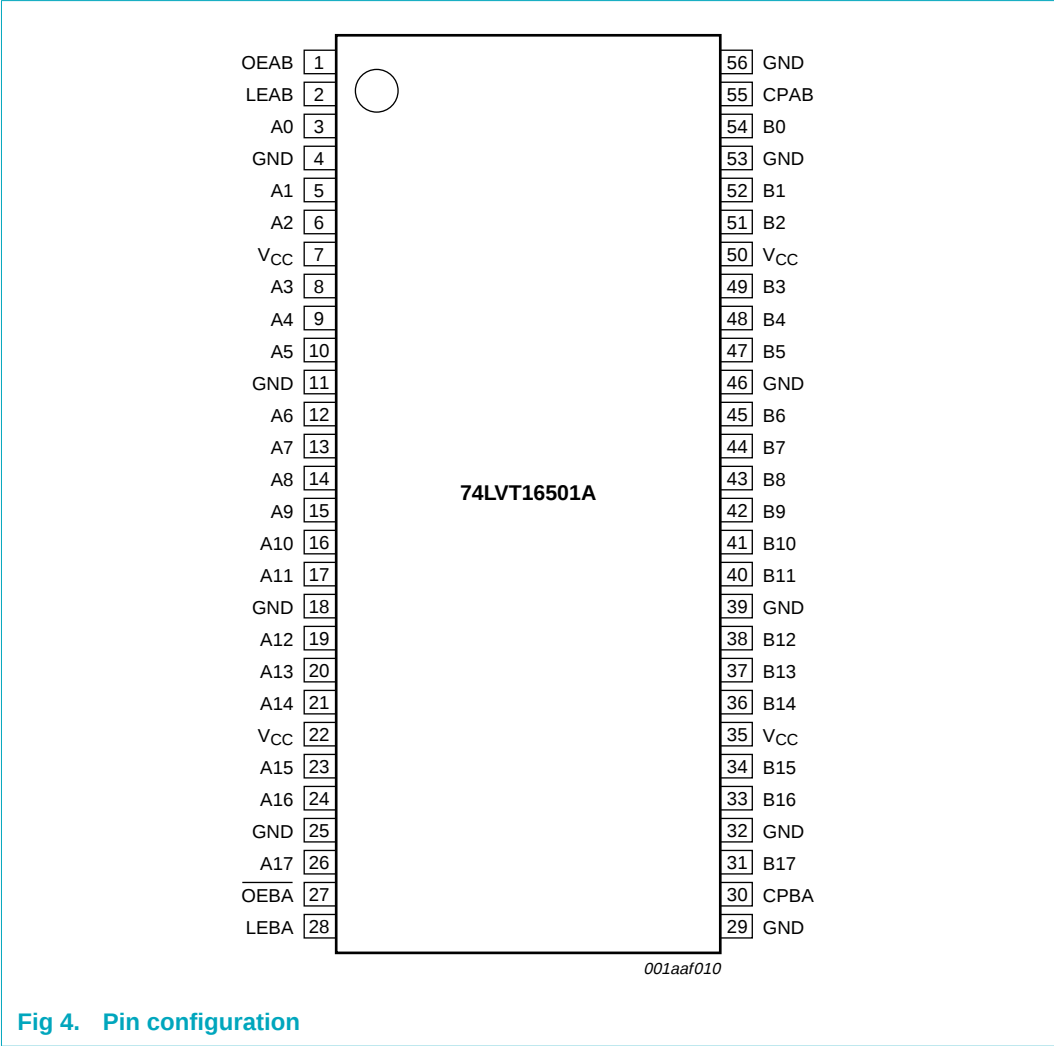
Type number	Package			
	Temperature range	Name	Description	Version
74LVT16501ADL	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$	SSOP56	plastic shrink small outline package; 56 leads; body width 7.5 mm	SOT371-1
74LVT16501ADGG	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$	TSSOP56	plastic thin shrink small outline package; 56 leads; body width 6.1 mm	SOT364-1

5. Functional diagram



6. Pinning information

6.1 Pinning



6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
OEAB	1	A-to-B output enable input
LEAB	2	A-to-B latch enable input
A0	3	data input or output A0
GND	4	ground (0 V)
A1	5	data input or output A1
A2	6	data input or output A2
V _{CC}	7	voltage supply
A3	8	data input or output A3

Table 3. Pin description ...continued

Symbol	Pin	Description
A4	9	data input or output A4
A5	10	data input or output A5
GND	11	ground (0 V)
A6	12	data input or output A6
A7	13	data input or output A7
A8	14	data input or output A8
A9	15	data input or output A9
A10	16	data input or output A10
A11	17	data input or output A11
GND	18	ground (0 V)
A12	19	data input or output A12
A13	20	data input or output A13
A14	21	data input or output A14
V _{CC}	22	voltage supply
A15	23	data input or output A15
A16	24	data input or output A16
GND	25	ground (0 V)
A17	26	data input or output A17
OEBA	27	B-to-A output enable input (active LOW)
LEBA	28	B-to-A latch enable input
GND	29	ground (0 V)
CPBA	30	B-to-A clock input (active rising edge)
B17	31	data input or output B17
GND	32	ground (0 V)
B16	33	data input or output B16
B15	34	data input or output B15
V _{CC}	35	voltage supply
B14	36	data input or output B14
B13	37	data input or output B13
B12	38	data input or output B12
GND	39	ground (0 V)
B11	40	data input or output B11
B10	41	data input or output B10
B9	42	data input or output B9
B8	43	data input or output B8
B7	44	data input or output B7
B6	45	data input or output B6
GND	46	ground (0 V)
B5	47	data input or output B5
B4	48	data input or output B4
B3	49	data input or output B3

Table 3. Pin description ...continued

Symbol	Pin	Description
V _{CC}	50	voltage supply
B2	51	data input or output B2
B1	52	data input or output B1
GND	53	ground (0 V)
B0	54	data input or output B0
CPAB	55	A-to-B clock input (active rising edge)
GND	56	ground (0 V)

7. Functional description

7.1 Function table

Table 4. Function table^[1]

Operating mode	Control			Input	Internal register	Output
	OEAB	LEAB	CPAB	A _n		B _n
	OEBA	LEBA	CPBA	B _n		A _n
Disabled	L	H	X	X	X	Z
Disabled, latch data	L	↓	X	h	H	Z
				l	L	Z
Disabled, hold data	L	L	H or L	X	NC	Z
Disabled, clock data	L	L	↑	h	H	Z
				l	L	Z
Transparent	H	H	X	H	H	H
				L	L	L
Latch data and display	H	↓	X	h	H	H
				l	L	L
Clock data and display	H	L	↑	h	H	H
				l	L	L
Hold data and display	H	L	H or L	X	H	H
				X	L	L

- [1] H = HIGH voltage level;
h = HIGH voltage level one setup time prior to the enable or clock transition;
L = LOW voltage level;
l = LOW voltage level one setup time prior to the enable or clock transition;
NC = no change;
X = don't care;
Z = high-impedance OFF-state;
↓ = HIGH-to-LOW enable transition;
↑ = LOW-to-HIGH clock transition.

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
V_I	input voltage		[1] -0.5	+7.0	V
V_O	output voltage	output in OFF-state or HIGH-state	[1] -0.5	+7.0	V
I_{IK}	input clamping current	$V_I < 0$ V	-	-50	mA
I_{OK}	output clamping current	$V_O < 0$ V	-	-50	mA
I_O	output current	output in LOW-state	-	128	mA
		output in HIGH-state	-	-64	mA
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		[2] -	150	°C

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

[2] The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

9. Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	supply voltage		2.7	-	3.6	V
V_I	input voltage		0	-	5.5	V
V_{IH}	HIGH-state input voltage		2.0	-	-	V
V_{IL}	LOW-state input voltage		-	-	0.8	V
I_{OH}	HIGH-state output current		-	-	-32	mA
I_{OL}	LOW-state output current	none	-	-	32	mA
		current duty cycle ≤ 50 %; $f \geq 1$ kHz	-	-	64	mA
$\Delta t/\Delta V$	input transition rise and fall rate	outputs enabled	-	-	10	ns/V
T_{amb}	ambient temperature	free air	-40	-	+85	°C

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} = −40 °C to +85 °C[1]						
V _{IK}	input clamping voltage	V _{CC} = 2.7 V; I _{IK} = −18 mA	-	−0.85	−1.2	V
V _{OH}	HIGH-state output voltage	V _{CC} = 2.7 V to 3.6 V; I _{OH} = −100 μA	V _{CC} − 0.2	V _{CC}	-	V
		V _{CC} = 2.7 V; I _{OH} = −8 mA	2.4	2.55	-	V
		V _{CC} = 3.0 V; I _{OH} = −32 mA	2.0	2.3	-	V
V _{OL}	LOW-state output voltage	V _{CC} = 2.7 V				
		I _{OL} = 100 μA	-	0.07	0.2	V
		I _{OL} = 24 mA	-	0.3	0.5	V
		V _{CC} = 3.0 V				
		I _{OL} = 16 mA	-	0.25	0.4	V
		I _{OL} = 32 mA	-	0.3	0.5	V
		I _{OL} = 64 mA	-	0.36	0.55	V
V _{RST}	power-up output low voltage	V _{CC} = 3.6 V; I _O = 1 mA; V _I = V _{CC} or GND	[2] -	0.1	0.55	V
I _{LI}	input leakage current					
	control pins	V _{CC} = 3.6 V; V _I = V _{CC} or GND	-	0.1	±1	μA
		V _{CC} = 0 V or 3.6 V; V _I = 5.5 V	-	0.1	10	μA
	I/O data pins	V _{CC} = 3.6 V	[3]			
		V _I = 5.5 V	-	1.0	20	μA
		V _I = V _{CC}	-	0.1	10	μA
		V _I = 0 V	-	+0.1	−5	μA
I _{OFF}	power-off leakage current	V _{CC} = 0 V; V _I or V _O = 0 V to 4.5 V	-	1.0	±100	μA
I _{HOLD}	bus hold current data input	V _{CC} = 3.0 V	[4]			
		V _I = 0.8 V	75	130	-	μA
		V _I = 2.0 V	−75	−130	-	μA
		V _{CC} = 3.6 V	[4]			
		V _I = 0 V to 3.6 V	±500	-	-	μA
I _{EX}	external current into output	output in HIGH-state when V _O > V _{CC} ; V _O = 5.5 V; V _{CC} = 3.0 V	-	50	125	μA
I _{O(pu/pd)}	power-up/power-down output current	V _{CC} ≤ 1.2 V; V _O = 0.5 V to V _{CC} ; V _I = GND or V _{CC} ; OEAB or OEBA don't care	[5] -	40	±100	μA
I _{CC}	quiescent supply current	V _{CC} = 3.6 V; V _I = GND or V _{CC} ; I _O = 0 A				
		outputs HIGH-state	-	0.07	0.12	mA
		outputs LOW-state	-	4	5	mA
		outputs disabled	[6] -	0.07	0.12	mA

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 quiescent supply current	per input pin; $V_{CC} = 3.0\text{ V}$ to 3.6 V ; one input at $V_{CC} - 0.6\text{ V}$, other inputs at V_{CC} or GND	[1] -	0.1	0.2	mA
C_i	input capacitance (control pins)	$V_i = 0\text{ V}$ or 3.0 V	-	3	-	pF
C_{io}	input/output capacitance (I/O pins)	outputs disabled; $V_{I/O} = 0\text{ V}$ or 3.0 V	-	9	-	pF

[1] Typical values are at $V_{CC} = 3.3\text{ V}$ and $T_{amb} = 25\text{ }^{\circ}\text{C}$.

[2] For valid test results, data must not be loaded into the flip-flops (or latches) after applying power.

[3] Unused pins at V_{CC} or GND.

[4] This is the bus hold overdrive current required to force the input to the opposite logic state.

[5] This parameter is valid for any V_{CC} between 0 V and 1.2 V with a transition time of up to 10 ms. From $V_{CC} = 1.2\text{ V}$ to $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ a transition time of 100 μs is permitted. This parameter is valid for $T_{amb} = 25\text{ }^{\circ}\text{C}$ only.[6] I_{CC} is measured with outputs pulled to V_{CC} or GND.[7] This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.

11. Dynamic characteristics

Table 8. Dynamic characteristicsVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CC} = 2.7\text{ V}$; $T_{amb} = -40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$						
t_{PLH}	propagation delay					
	An to Bn or Bn to An	see Figure 5	-	-	5.4	ns
	CPAB to Bn or CPBA to An	see Figure 6	-	-	6.4	ns
	LEAB to Bn or LEBA to An	see Figure 7	-	-	6.4	ns
t_{PHL}	propagation delay		-	-		
	An to Bn or Bn to An	see Figure 5	-	-	5.4	ns
	CPAB to Bn or CPBA to An	see Figure 6	-	-	6.4	ns
	LEAB to Bn or LEBA to An	see Figure 7	-	-	6.4	ns
t_{PZH}	output enable time to HIGH-state	see Figure 8	-	-	5.5	ns
t_{PZL}	output enable time to LOW-state	see Figure 9	-	-	5.2	ns
t_{PHZ}	output disable time from HIGH-state	see Figure 8	-	-	6.3	ns
t_{PLZ}	output disable time from LOW-state	see Figure 9	-	-	5.6	ns
$t_{su(H)}$	setup time HIGH	see Figure 10				
	An to CPAB or Bn to CPBA		2.4	-	-	ns
	An to LEAB with CPAB LOW or Bn to LEBA with CPBA LOW		2.0	-	-	ns
	An to LEAB with CPAB HIGH or Bn to LEBA with CPBA HIGH		1.5	-	-	ns

Table 8. Dynamic characteristics ...continuedVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{su(L)}$	setup time LOW	see Figure 10				
	An to CPAB or Bn to CPBA		2.4	-	-	ns
	An to LEAB with CPAB LOW or Bn to LEBA with CPBA LOW		2.0	-	-	ns
	An to LEAB with CPAB HIGH or Bn to LEBA with CPBA HIGH		1.5	-	-	ns
$t_{h(H)}$	hold time HIGH	see Figure 10				
	An to CPAB or Bn to CPBA		0	-	-	ns
	An to LEAB or Bn to LEAB		0.4	-	-	ns
$t_{h(L)}$	hold time LOW	see Figure 10		-		
	An to CPAB or Bn to CPBA		0	-	-	ns
	An to LEAB or Bn to LEAB		0.4	-	-	ns
t_{WH}	pulse width HIGH			-		
	CPAB or CPBA	see Figure 6	1.5	-	-	ns
	LEAB or LEBA	see Figure 7	1.5	-	-	ns
t_{WL}	pulse width LOW			-		
	CPAB or CPBA	see Figure 6	1.5	-	-	ns
$V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$; $T_{amb} = -40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$^[1]						
t_{PLH}	propagation delay					
	An to Bn or Bn to An	see Figure 5	0.5	1.9	4.2	ns
	CPAB to Bn or CPBA to An	see Figure 6	1.0	3.2	5.4	ns
	LEAB to Bn or LEBA to An	see Figure 7	1.0	2.4	5.4	ns
t_{PHL}	propagation delay					
	An to Bn or Bn to An	see Figure 5	0.5	1.9	4.2	ns
	CPAB to Bn or CPBA to An	see Figure 6	1.0	3.2	5.4	ns
	LEAB to Bn or LEBA to An	see Figure 7	1.0	2.9	5.4	ns
t_{PZH}	output enable time to HIGH-state	see Figure 8	1.0	2.4	4.8	ns
t_{PZL}	output enable time to LOW-state	see Figure 9	1.0	2.2	4.8	ns
t_{PHZ}	output disable time from HIGH-state	see Figure 8	1.0	2.8	5.8	ns
t_{PLZ}	output disable time from LOW-state	see Figure 9	1.0	3.2	5.2	ns
$t_{su(H)}$	setup time HIGH	see Figure 10				
	An to CPAB or Bn to CPBA		2.1	1.0	-	ns
	An to LEAB with CPAB LOW or Bn to LEBA with CPBA LOW		1.8	1.6	-	ns
	An to LEAB with CPAB HIGH or Bn to LEBA with CPBA HIGH		2.0	1.6	-	ns
$t_{su(L)}$	setup time LOW	see Figure 10				
	An to CPAB or Bn to CPBA		2.1	0.7	-	ns
	An to LEAB with CPAB LOW or Bn to LEBA with CPBA LOW		1.8	1.6	-	ns
	An to LEAB with CPAB HIGH or Bn to LEBA with CPBA HIGH		2.0	1.6	-	ns

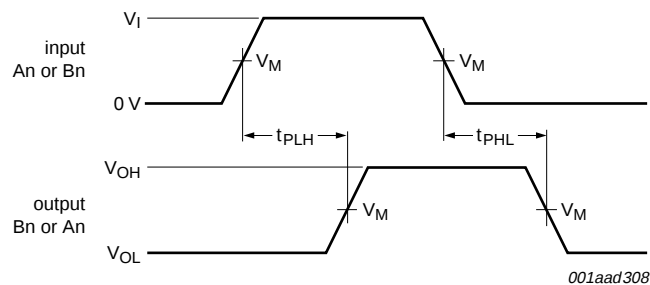
Table 8. Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{h(H)}$	hold time HIGH	see Figure 10				
	An to CPAB or Bn to CPBA		0.3	0	-	ns
	An to LEAB or Bn to LEAB		0.2	0	-	ns
$t_{h(L)}$	hold time LOW	see Figure 10				
	An to CPAB or Bn to CPBA		0.3	0	-	ns
	An to LEAB or Bn to LEAB		0.2	0	-	ns
t_{WH}	pulse width HIGH					
	CPAB or CPBA	see Figure 6	1.2	0.8	-	ns
	LEAB or LEBA	see Figure 7	1.2	0.8	-	ns
t_{WL}	pulse width LOW					
	CPAB or CPBA	see Figure 6	1.2	0.8	-	ns
f_{max}	maximum input clock frequency	see Figure 6	150	-	-	MHz

[1] All typical values are measured at $V_{CC} = 3.3$ V and $T_{amb} = 25$ °C.

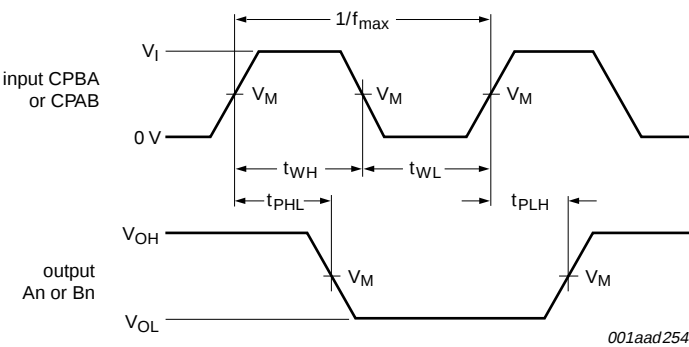
12. Waveforms



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

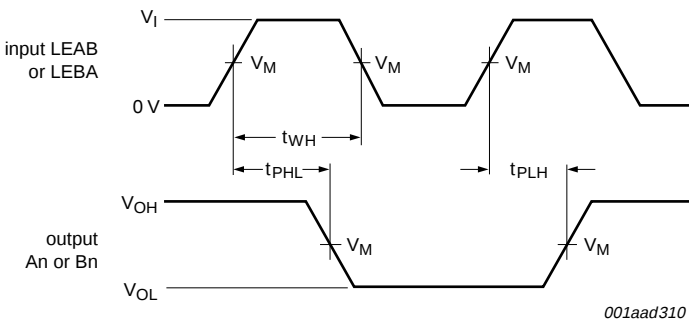
V_{OL} and V_{OH} are typical voltage output drop that occur with the output load.

Fig 5. Propagation delay input (An, Bn) to output (Bn, An) in transparent mode



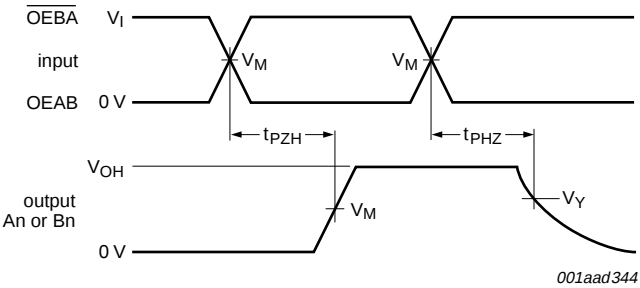
Measurement points are given in [Table 9](#).
 V_{OL} and V_{OH} are typical voltage output drop that occur with the output load.

Fig 6. Propagation delay clock (CPAB, CPBA) to output (An, Bn), clock (CPAB, CPBA) pulse width and maximum clock frequency (CPAB, CPBA)



Measurement points are given in [Table 9](#).
 V_{OL} and V_{OH} are typical voltage output drop that occur with the output load.

Fig 7. Propagation delay latch enable (LEAB, LEBA) to output (An, Bn) and latch enable (LEAB, LEBA) pulse width



Measurement points are given in [Table 9](#).
 V_{OH} is typical voltage output drop that occur with the output load.

Fig 8. 3-state output enable time to HIGH-state and output disable time from HIGH-state

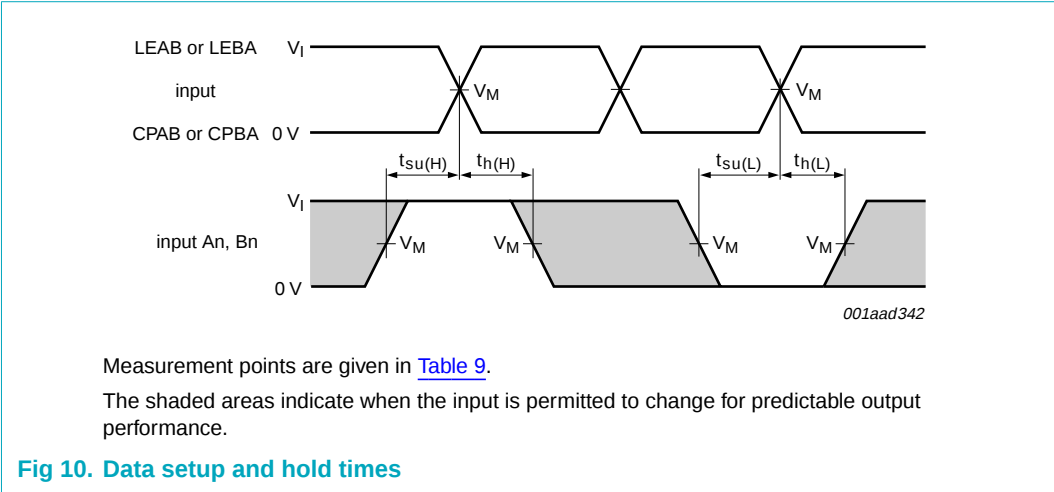
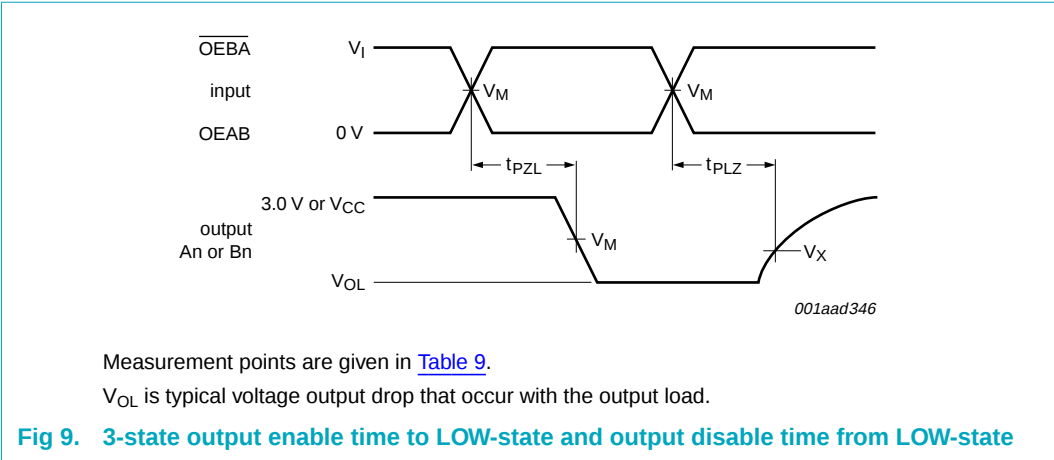


Table 9. Measurement points

Supply voltage	Input	Output		
	V_M	V_M	V_X	V_Y
2.7 V	1.5 V	1.5 V	$V_{OL} + 0.3 \text{ V}$	$V_{OH} - 0.3 \text{ V}$
3.3 V	1.5 V	1.5 V	$V_{OL} + 0.3 \text{ V}$	$V_{OH} - 0.3 \text{ V}$

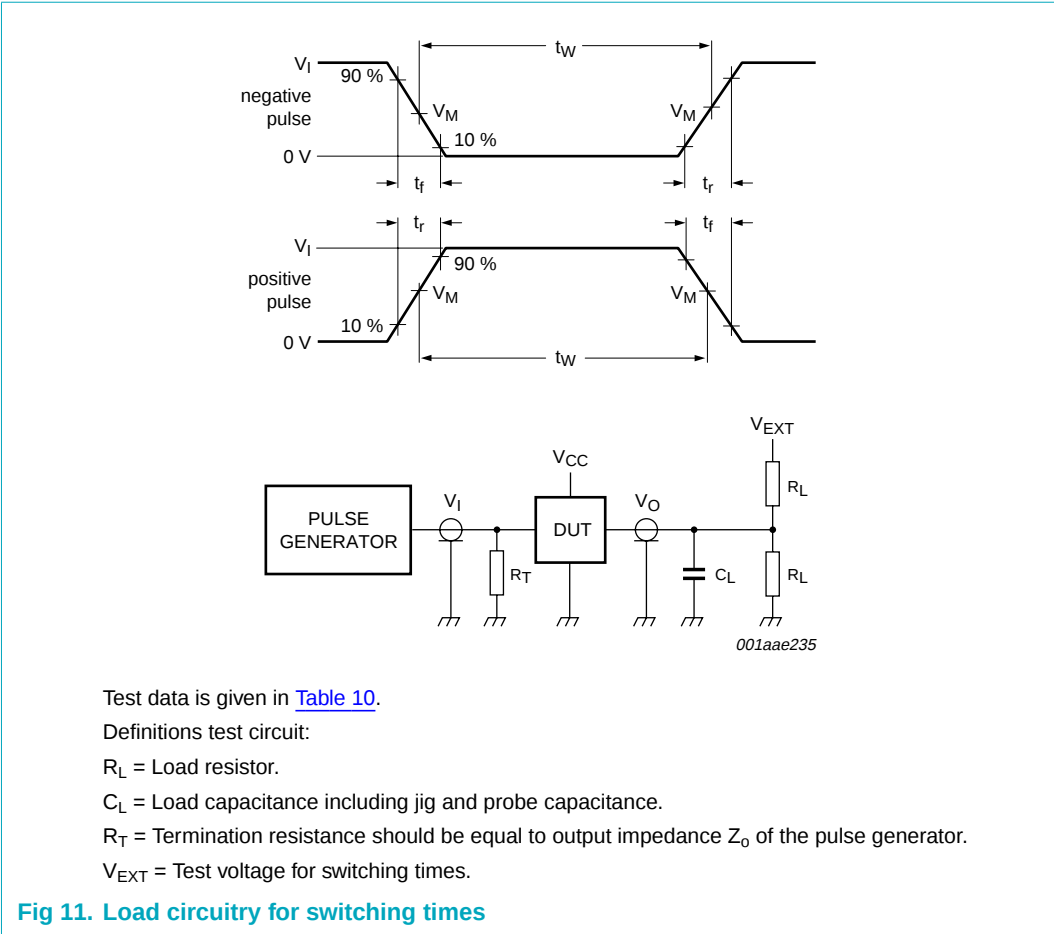


Table 10. Test data

Input				Load		V_{EXT}		
V_I	f_i	t_W	t_r, t_f	C_L	R_L	t_{PHZ}, t_{PZH}	t_{PLZ}, t_{PZL}	t_{PLH}, t_{PHL}
2.7 V	≤ 10 MHz	500 ns	≤ 2.5 ns	50 pF	500 Ω	GND	6 V	open

13. Package outline

SSOP56: plastic shrink small outline package; 56 leads; body width 7.5 mm

SOT371-1

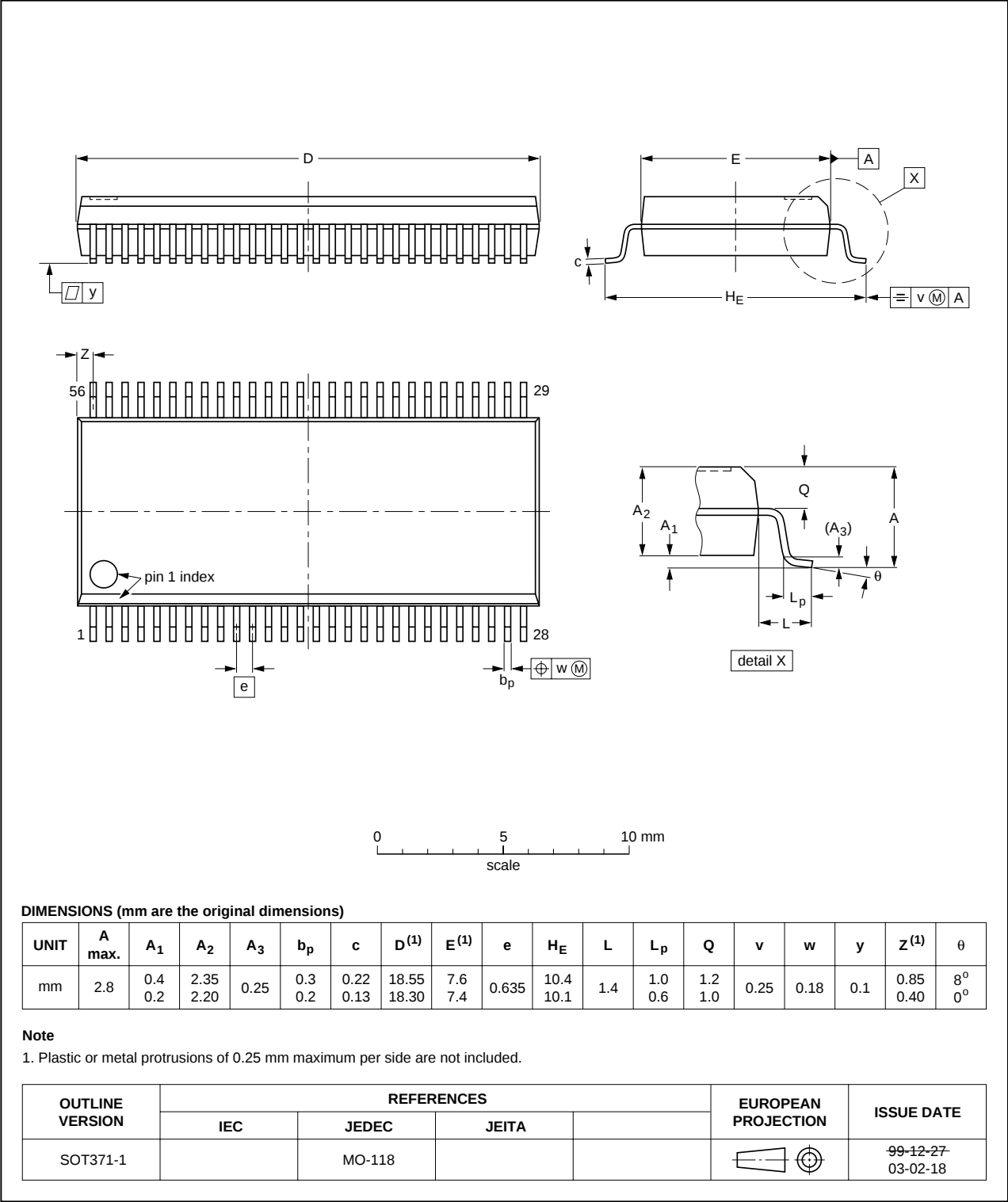


Fig 12. Package outline SOT371-1 (SSOP56)

TSSOP56: plastic thin shrink small outline package; 56 leads; body width 6.1 mm

SOT364-1

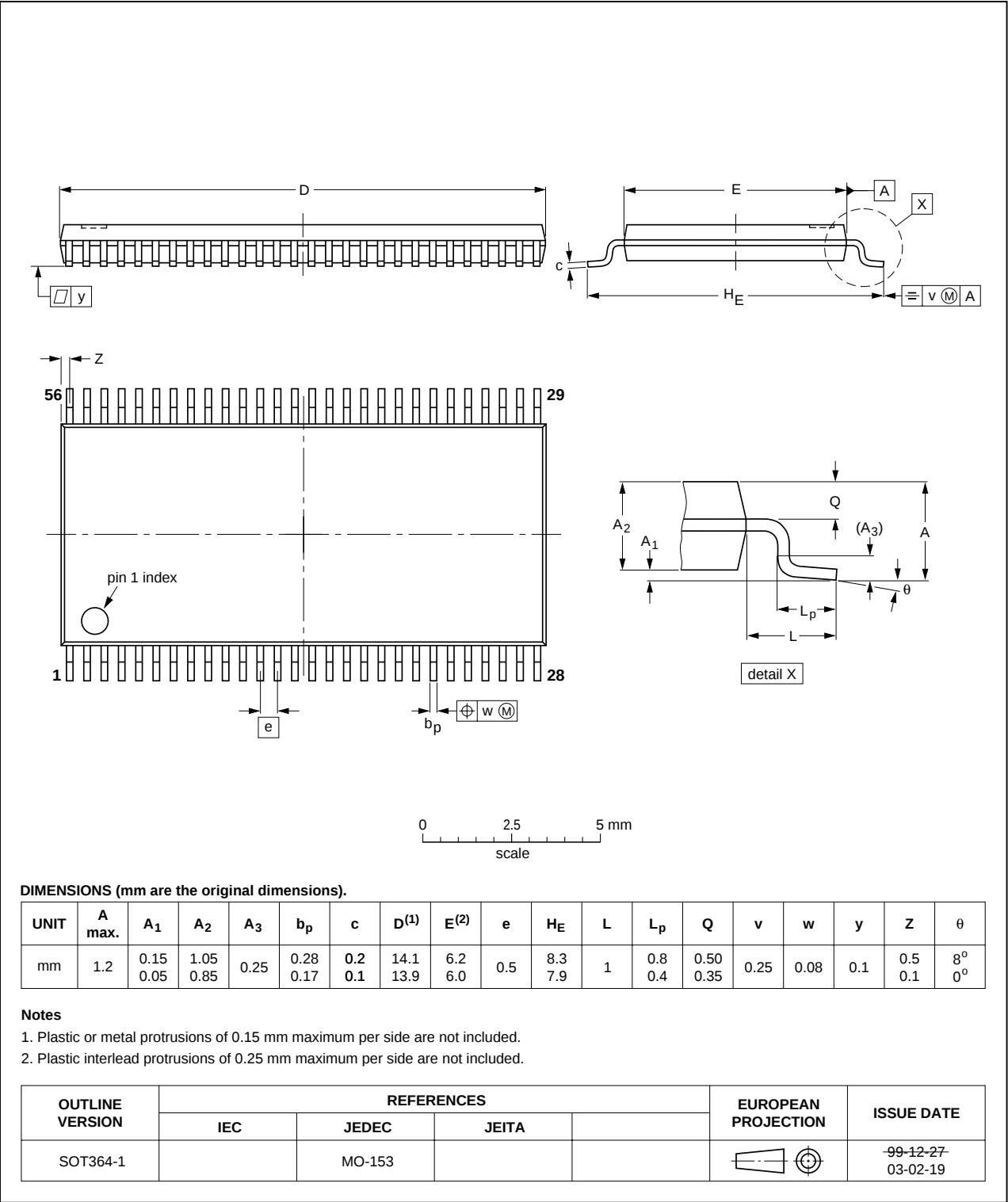


Fig 13. Package outline SOT364-1 (TSSOP56)

14. Abbreviations

Table 11. Abbreviations

Acronym	Description
BiCMOS	Bipolar Complementary Metal Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
TTL	Transistor-Transistor Logic

15. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVT16501A_4	20060519	Product data sheet	-	74LVT16501A_3
Modifications:	• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors. • Section 2: replaced JESD17 with JESD78. • Figure 3: corrected clock names. • Table 7: changed I_{HOLD} conditions $V_{\text{CC}} = 0 \text{ V}$ to 3.6 V into $V_{\text{I}} = 0 \text{ V}$ to 3.6 V. • Table 8: – Changed values for output enable and output disable times. – Added new parameters and changed values for setup and hold times.			
74LVT16501A_3	19980219	Product specification	-	74LVT16501A_2
74LVT16501A_2	19970612	Product specification	-	74LVT16501A_1
74LVT16501A_1	-	-	-	-

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>.

16.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Philips Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Philips Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

16.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, Philips Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — Philips Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Philips Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or

malfunction of a Philips Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Philips Semiconductors accepts no liability for inclusion and/or use of Philips Semiconductors products in such equipment or applications and therefore such inclusion and/or use is for the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — Philips Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.semiconductors.philips.com/profile/terms>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by Philips Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

16.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

17. Contact information

For additional information, please visit: <http://www.semiconductors.philips.com>

For sales office addresses, send an email to: sales.addresses@www.semiconductors.philips.com

18. Contents

1	General description	1
2	Features	1
3	Quick reference data	2
4	Ordering information	2
5	Functional diagram	3
6	Pinning information	4
6.1	Pinning	4
6.2	Pin description	4
7	Functional description	6
7.1	Function table	6
8	Limiting values	7
9	Recommended operating conditions	7
10	Static characteristics	8
11	Dynamic characteristics	9
12	Waveforms	11
13	Package outline	15
14	Abbreviations	17
15	Revision history	17
16	Legal information	18
16.1	Data sheet status	18
16.2	Definitions	18
16.3	Disclaimers	18
16.4	Trademarks	18
17	Contact information	18
18	Contents	19

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



© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

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

For sales office addresses, email to: sales.addresses@www.semiconductors.philips.com.

Date of release: 19 May 2006

Document identifier: 74LVT16501A_4