3.3 V 16-bit buffer/driver; 3-state Rev. 15 — 8 July 2024

1. General description

The 74LVT16244B; 74LVTH16244B is a 16-bit buffer/line driver with 3-state outputs. The device can be used as four 4-bit buffers, two 8-bit buffers or one 16-bit buffer. The device features four output enables (1 \overline{OE} , 2 \overline{OE} , 3 \overline{OE} and 4 \overline{OE}), each controlling four of the 3-state outputs. A HIGH on n \overline{OE} causes the outputs to assume a high-impedance OFF-state. Bus hold data inputs eliminate the need for external pull-up resistors to define unused inputs

2. Features and benefits

- 16-bit bus interface
- 3-state buffers
- Wide supply voltage range from 2.7 to 3.6 V
- Overvoltage tolerant inputs to 5.5 V
- BiCMOS high speed and output drive
- Output capability: +64 mA and -32 mA
- Direct interface with TTL levels
- Bus hold data inputs eliminate need for external pull-up resistors to hold unused inputs
- Power-up 3-state
- Live insertion and extraction permitted
- No bus current loading when output is tied to 5 V bus
- IOFF circuitry provides partial Power-down mode operation
- Latch-up performance exceeds 500 mA per JESD 78 Class II Level B
- Complies with JEDEC standard JESD8C (2.7 V to 3.6 V)
- ESD protection:
 - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
 - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Specified from -40 °C to 85 °C

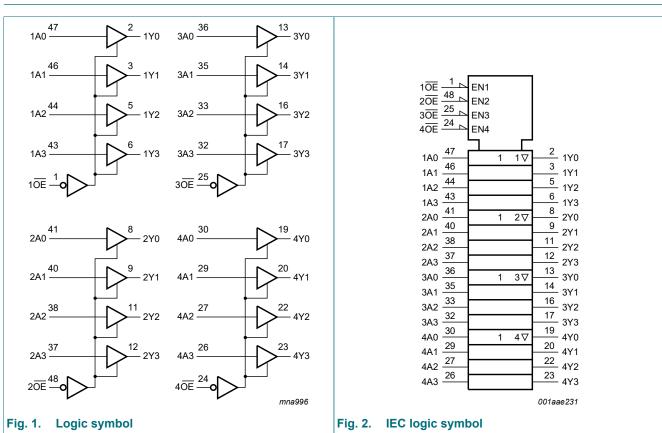
3. Ordering information

Table 1. Ordering information

Type number	Package				
	Temperature range	Name	Description	Version	
74LVT16244BDGG 74LVTH16244BDGG	-40 °C to +85 °C	TSSOP48	plastic thin shrink small outline package; 48 leads; body width 6.1 mm	<u>SOT362-1</u>	



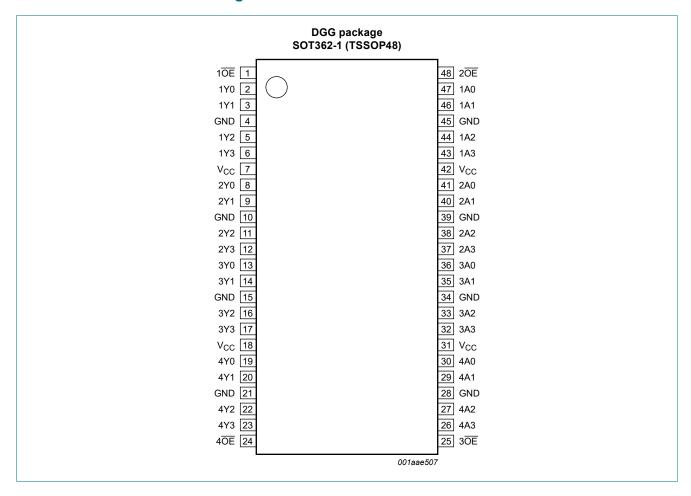
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4. Functional diagram

5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description						
Symbol	Pin	Description				
10E, 20E, 30E, 40E	1, 48, 25, 24	output enable input (active LOW)				
1Y0, 1Y1, 1Y2, 1Y3	2, 3, 5, 6	data output				
2Y0, 2Y1, 2Y2, 2Y3	8, 9, 11, 12	data output				
3Y0, 3Y1, 3Y2, 3Y3	13, 14, 16, 17	data output				
4Y0, 4Y1, 4Y2, 4Y3	19, 20, 22, 23	data output				
GND	4, 10, 15, 21, 28, 34, 39, 45	ground (0 V)				
V _{CC}	7, 18, 31, 42	supply voltage				
1A0, 1A1, 1A2, 1A3	47, 46, 44, 43	data input				
2A0, 2A1, 2A2, 2A3	41, 40, 38, 37	data input				
3A0, 3A1, 3A2, 3A3	36, 35, 33, 32	data input				
4A0, 4A1, 4A2, 4A3	30, 29, 27, 26	data input				

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6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

	Input	Output
nOE	nAn	nYn
L	L	L
L	Н	Н
Н	X	Z

7. Limiting values

Table 4. 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
VI	input voltage	[1]	-0.5	+7.0	V
Vo	output voltage	output in OFF-state or HIGH-state [1]	-0.5	+7.0	V
I _{IK}	input clamping current	V ₁ < 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
Tj	junction temperature	[2]	-	150	°C
P _{tot}	total power dissipation	T _{amb} = -40 °C to +85 °C;	-	500	mW

The input and output negative voltage ratings may be exceeded if the input and output clamp current ratings are observed.
 The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

8. Recommended operating conditions

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Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V _{CC}	supply voltage		2.7	-	3.6	V
VI	input voltage		0	-	5.5	V
V _{IH}	HIGH-level input voltage		2.0	-	-	V
VIL	LOW-level input voltage		-	-	0.8	V
I _{OH}	HIGH-level output current		-32	-	-	mA
l _{OL}	LOW-level output current	none	-	-	32	mA
		current duty cycle \leq 50 %; f _i \geq 1 kHz	-	-	64	mA
T _{amb}	ambient temperature	in free-air	-40	-	+85	°C
Δt/ΔV	input transition rise and fall rate	outputs enabled	-	-	10	ns/V

9. Static characteristics

Table 6. Static characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); T_{amb} = -40 °C to +85 °C.

Symbol	Parameter	Conditions		Min	Тур <mark>[1]</mark>	Мах	Unit
V _{IK}	input clamping voltage	V _{CC} = 2.7 V; I _{IK} = -18 mA		-1.2	-0.85	-	V
V _{OH}	HIGH-level output	I_{OH} = -100 µA; V _{CC} = 2.7 V to 3.6 V		V _{CC} - 0.2	V _{CC}	-	V
	voltage	I _{OH} = -8 mA; V _{CC} = 2.7 V		2.4	2.5	-	V
		I _{OH} = -32 mA; V _{CC} = 3.0 V		2.0	2.3	-	V
V _{OL}	LOW-level output	V _{CC} = 2.7 V					
	voltage	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		-	0.4	0.55	V
I _I	input leakage	all input pins; V_{CC} = 0 V or 3.6 V; V_{I} = 5.5 V		-	0.1	10	μA
	current	control pins; V_{CC} = 3.6 V; V_I = V_{CC} or GND		-	0.1	±1.0	μA
		data pins; V_{CC} = 3.6 V	[2]				
		$V_{I} = V_{CC}$		-	0.1	1	μA
		$V_{I} = 0 V$		-5	-0.1	-	μA
I _{OFF}	power-off leakage current	V_{CC} = 0 V; V ₁ or V ₀ = 0 V to 4.5 V		-	0.1	±100	μA
I _{BHL}	bus hold LOW current	V _{CC} = 3 V; V ₁ = 0.8 V	[3]	75	135	-	μA
I _{BHH}	bus hold HIGH current	$V_{CC} = 3 V; V_1 = 2.0 V$		-	-135	-75	μA
I _{BHLO}	bus hold LOW overdrive current	nAn input; V_{CC} = 3.6 V; V_1 = 0 V to 3.6 V		500	-	-	μA
I _{BHHO}	bus hold HIGH overdrive current	nAn input; V_{CC} = 3.6 V; V_1 = 0 V to 3.6 V		-	-	-500	μA
I _{LO}	output leakage current	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	$V_{CC} \le 1.2 \text{ V}; V_O = 0.5 \text{ V to } V_{CC};$ $V_I = \text{GND or } V_{CC}; n\overline{\text{OE}} = \text{don't care}$	[4]	-	1	±100	μA
l _{oz}	OFF-state output	V_{CC} = 3.6 V; V_{I} = V_{IH} or V_{IL}					
	current	output HIGH: V _O = 3.0 V		-	0.5	5	μA
		output LOW: V _O = 0.5 V		-5	+0.5	-	μA
I _{CC}	supply current	V_{CC} = 3.6 V; V_{I} = GND or V_{CC} ; I_{O} = 0 A					
		output HIGH		-	0.07	0.12	mA
		output LOW		-	4.0	6.0	mA
		outputs disabled	[5]	-	0.07	0.12	mA
ΔI _{CC}	additional supply current	per input pin; V_{CC} = 3.0 V to 3.6 V; one input at V_{CC} - 0.6 V, other inputs at V_{CC} or GND	[6]	-	0.1	0.2	mA

3.3 V 16-bit buffer/driver; 3-state

Symbol	Parameter	Conditions	Min	Тур <mark>[1]</mark>	Max	Unit
CI	input capacitance	V _I = 0 V or 3.0 V	-	3	-	pF
Co	output capacitance	outputs disabled; V _O = 0 V or 3.0 V	-	9	-	pF

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

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

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

[4] 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 V to

 V_{CC} = 3.3 V ± 0.3 V a transition time of 100 µs is permitted. This parameter is valid for T_{amb} = 25 °C only.

[5] I_{CC} is measured with outputs pulled to V_{CC} or GND.

[6] This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.

10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); T_{amb} = -40 °C to +85 °C; for test circuit see Fig. 5.

Symbol	Parameter	Conditions	Min	Typ [1]	Мах	Unit	
t _{PLH}	LOW to HIGH	nAn to nYn; see <u>Fig. 3</u>					
	propagation delay	V _{CC} = 2.7 V	-	-	4.0	ns	
		V _{CC} = 3.0 V to 3.6 V	0.5	1.8	3.2	ns	
t _{PHL}	HIGH to LOW	nAn to nYn; see <u>Fig. 3</u>					
	propagation delay	V _{CC} = 2.7 V	-	-	4.0	ns	
		V _{CC} = 3.0 V to 3.6 V	0.5	1.7	3.2	ns	
t _{PZH}	PZH OFF-state to HIGH	OFF-state to HIGH nOE to nYn; see Fig. 4					
propa	propagation delay	V _{CC} = 2.7 V	-	-	5.0	ns	
		V _{CC} = 3.0 V to 3.6 V	1.0	2.3	4.0	ns	
t _{PZL}	OFF-state to LOW	nOE to nYn; see <u>Fig. 4</u>					
	propagation delay	V _{CC} = 2.7 V	-	-	5.3	ns	
		V _{CC} = 3.0 V to 3.6 V	1.0	2.1	4.0	ns	
t _{PHZ}	HIGH to OFF-state	nOE to nYn; see <u>Fig. 4</u>					
	propagation delay	V _{CC} = 2.7 V	-	-	5.0	ns	
		V _{CC} = 3.0 V to 3.6 V	1.0	3.2	4.5	ns	
t _{PLZ}	LOW to OFF-state	nOE to nYn; see <u>Fig. 4</u>					
	propagation delay V _{CC} = 2.7 V		-	-	4.4	ns	
		V _{CC} = 3.0 V to 3.6 V	1.0	2.9	4.0	ns	

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

3.3 V 16-bit buffer/driver; 3-state



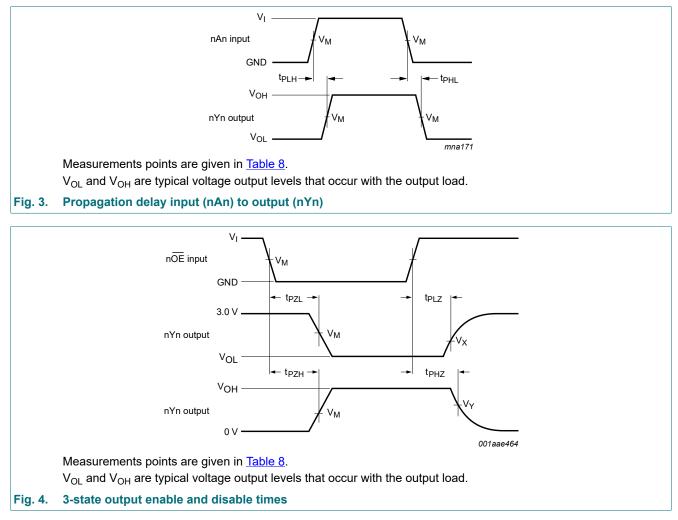


Table 8. Measurement points

Input	Output		
V _M	V _M	V _X	V _Y
1.5 V	1.5 V	V _{OL} + 0.3 V	V _{OH} - 0.3 V

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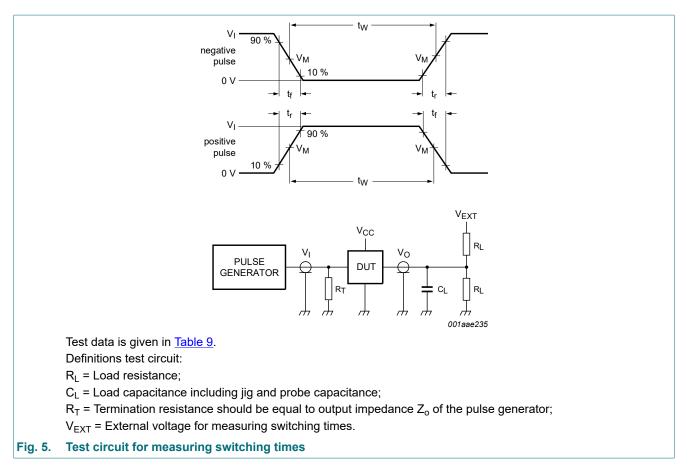


Table 9. Test data

Input				Load		V _{EXT}		
VI	f _i	tw	t _r , t _f	CL	RL	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

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11. Package outline

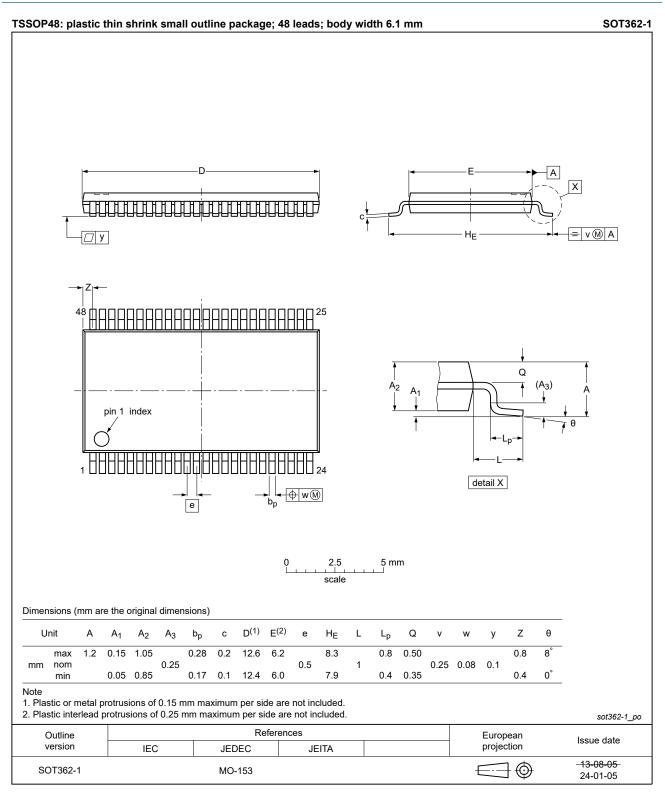


Fig. 6. Package outline SOT362-1 (TSSOP48)

12. Abbreviations

Table 10. Abbreviations					
Acronym	Description				
ANSI	American National Standards Institute				
BiCMOS	Bipolar Complementary Metal Oxide Semiconductor				
CDM	Charge Device Model				
DUT	Device Under Test				
ESD	ElectroStatic Discharge				
ESDA	ElectroStatic Discharge Association				
HBM	Human Body Model				
JEDEC	Joint Electron Device Engineering Council				
TTL	Transistor-Transistor Logic				

13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes				
74LVT_LVTH16244B v.15	20240708	Product data sheet	-	74LVT_LVTH16244B v.14				
Modifications:	• <u>Section 2</u> : I	• <u>Section 2</u> : ESD specification updated according to the latest JEDEC standard.						
74LVT_LVTH16244B v.14	20240326	Product data sheet	-	74LVT_LVTH16244B v.13				
Modifications:	• <u>Fig. 6</u> : Upd	ated package outline dra	wing SOT362-1 (TS	SOP48).				
74LVT_LVTH16244B v.13	20210812	Product data sheet	-	74LVT_LVTH16244B v.12				
Modifications:	Type numb removed.	 Type numbers 74LVT16244BDL and 74LVTH16244BDL (SOT370-1/SSOP48) removed. 						
74LVT_LVTH16244B v.12	20181019	Product data sheet	-	74LVT_LVTH16244B v.11				
	 Legal texts Type numb 74LVTH162 	of Nexperia. have been adapted to th ers 74LVT16244BEV (S0 244BBX (SOT1134-2) re utline drawing <u>SOT362-1</u>	OT702-1), 74LVT162 moved.	ne where appropriate. 244BBX (SOT1134-2) and				
74LVT_LVTH16244B v.11	20120301	Product data sheet	-	74LVT_LVTH16244B v.10				
Modifications:	For type nu SOT1134-2		and 74LVTH16244B	BX the sot code has changed t				
74LVT_LVTH16244B v.10	20111122	Product data sheet	-	74LVT_LVTH16244B v.9				
Modifications:	Legal page	s updated.						
74LVT_LVTH16244B v.9	20110620	Product data sheet	-	74LVT_LVTH16244B v.8				
74LVT_LVTH16244B v.8	20100322	Product data sheet	-	74LVT_LVTH16244B v.7				
74LVT_LVTH16244B v.7	20090326	Product data sheet	-	74LVT_LVTH16244B v.6				
	20081113	Product data sheet	-	74LVT_LVTH16244B v.5				
74LVT_LVTH16244B v.6	20001113			74LV1_LV1110244D V.3				
	20060321	Product data sheet	-	74LVT16244B v.4				
74LVT_LVTH16244B v.6 74LVT_LVTH16244B v.5 74LVT16244B v.4		Product data sheet Product specification	•					

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Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVT16244B v.2	19980219	Product specification	-	-

14. Legal information

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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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Product data sheet

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