

SN74ALB16244 16-BIT BUFFER/DRIVER WITH 3-STATE OUTPUTS

SCBS647D – AUGUST 1995 – REVISED JANUARY 2001

- Member of Texas Instruments' Widebus™ Family
- State-of-the-Art Advanced Low-Voltage BiCMOS (ALB) Technology Design for 3.3-V Operation
- Schottky Diodes on All Inputs to Eliminate Overshoot and Undershoot
- Industry Standard '16244 Pinout
- Distributed V_{CC} and GND Pins Minimize High-Speed Switching Noise
- Flow-Through Architecture Optimizes PCB Layout

description

The SN74ALB16244 16-bit buffer and line driver is designed for high-speed, low-voltage (3.3-V) V_{CC} operation. This device is intended to replace the conventional driver in any speed-critical path. The small propagation delay is achieved using a unity-gain amplifier on the input and feedback resistors from input to output, which allows the output to track the input with a small offset voltage.

The device can be used as four 4-bit buffers, two 8-bit buffers, or one 16-bit buffer. This device provides true outputs and symmetrical active-low output-enable (\overline{OE}) inputs.

DGG, DGV, OR DL PACKAGE (TOP VIEW)

$\overline{1OE}$	1	48	$\overline{2OE}$
1Y1	2	47	1A1
1Y2	3	46	1A2
GND	4	45	GND
1Y3	5	44	1A3
1Y4	6	43	1A4
V _{CC}	7	42	V _{CC}
2Y1	8	41	2A1
2Y2	9	40	2A2
GND	10	39	GND
2Y3	11	38	2A3
2Y4	12	37	2A4
3Y1	13	36	3A1
3Y2	14	35	3A2
GND	15	34	GND
3Y3	16	33	3A3
3Y4	17	32	3A4
V _{CC}	18	31	V _{CC}
4Y1	19	30	4A1
4Y2	20	29	4A2
GND	21	28	GND
4Y3	22	27	4A3
4Y4	23	26	4A4
$\overline{4OE}$	24	25	$\overline{3OE}$

ORDERING INFORMATION

TA	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	SSOP – DL	Tube	SN74ALB16244DL	ALB16244
		Tape and reel	SN74ALB16244DLR	
	TSSOP – DGG	Tape and reel	SN74ALB16244DGGR	ALB16244
	TVSOP – DGV	Tape and reel	SN74ALB16244DGVR	AV244

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE (each buffer)

INPUTS		OUTPUT
\overline{OE}	A	Y
L	H	H
L	L	L
H	X	Z



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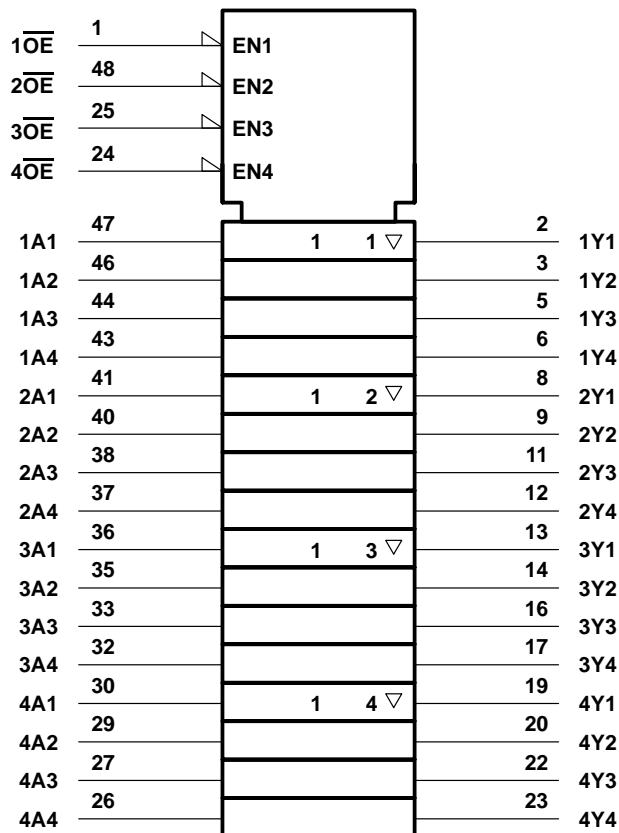
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16-BIT BUFFER/DRIVER

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logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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recommended operating conditions

		MIN	MAX	UNIT
V_{CC}	Supply voltage	3	3.6	V
I_{OH}^{\dagger}	High-level output current		-25	mA
I_{OL}^{\dagger}	Low-level output current		25	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	Outputs enabled		5 ns/V
T_A	Operating free-air temperature	-40	85	°C

[†] See Figures 1 and 2 for typical I/O ranges.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP [‡]	MAX	UNIT
V_{IK}	Data inputs	$V_{CC} = 3\text{ V}$	$I_I = 18\text{ mA}$	3.6	$V_{CC}-1.2$		V
			$I_I = -18\text{ mA}$	-0.9	-1.2		
I_I	Control inputs	$V_{CC} = 3.6\text{ V}$,	$V_I = V_{CC}$ or GND			±10	μA
	Data inputs	$V_{CC} = 3.6\text{ V}$	$V_I = V_{CC}$	\overline{OE} low	0.4	0.6	mA
				\overline{OE} high		25	μA
			$V_I = 0$	\overline{OE} low	-0.8	-1	mA
				\overline{OE} high		-60	μA
I_{OZH}	$V_{CC} = 3.6\text{ V}$,	$V_O = 3\text{ V}$	0.6	20	μA		
I_{OZL}	$V_{CC} = 3.6\text{ V}$,	$V_O = 0.5\text{ V}$	-0.1	-50	μA		
I_{CC}/buffer	$V_{CC} = 3.6\text{ V}$,	$I_O = 0$,	$V_I = V_{CC}$ or GND	3.7	5.6	mA	
I_{CCZ}	$V_{CC} = 3.6\text{ V}$,	Control inputs = V_{CC} or GND			0.8	mA	
ΔI_{CC}^{\S}	$V_{CC} = 3\text{ V}$ to 3.6 V , One input at $V_{CC} - 0.6\text{ V}$, Other inputs at V_{CC} or GND				600	μA	
C_i	$V_I = 3\text{ V}$ or 0			4.5		pF	
C_o	$V_O = 3\text{ V}$ or 0			5.5		pF	

[‡] All typical values are at $V_{CC} = 3.3\text{ V}$, $T_A = 25^{\circ}\text{C}$.

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

switching characteristics over recommended operating free-air temperature range, $C_L = 50\text{ pF}$ (unless otherwise noted) (see Figure 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$			UNIT
			MIN	TYP [‡]	MAX	
t_{pd}	A	Y	0.6	1.3	2	ns
t_{en}	\overline{OE}	Y	1.3	2.5	4.7	ns
t_{dis}	\overline{OE}	Y	1.8	2.8	4.2	ns

[‡] All typical values are at $V_{CC} = 3.3\text{ V}$, $T_A = 25^{\circ}\text{C}$.



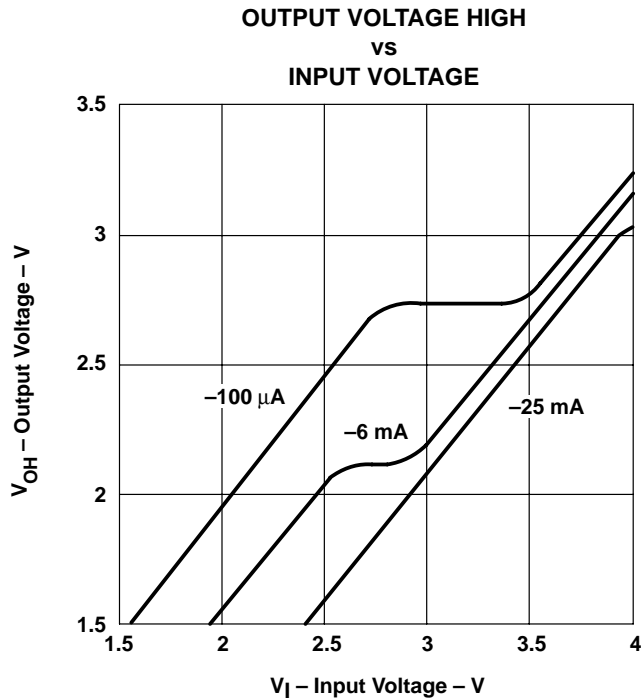


Figure 1. V_{OH} Over Recommended Free-Air Temperature Range

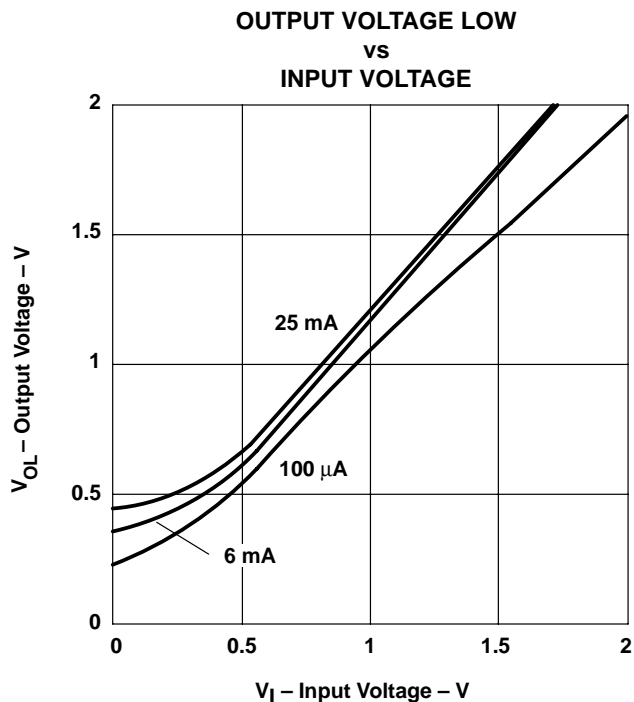
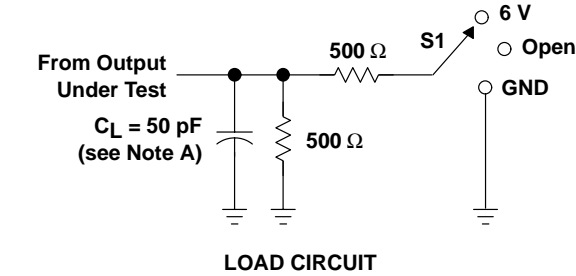


Figure 2. V_{OL} Over Recommended Free-Air Temperature Range

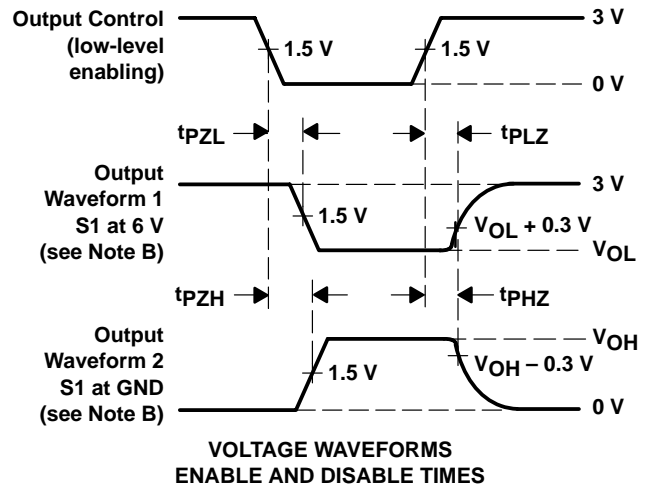
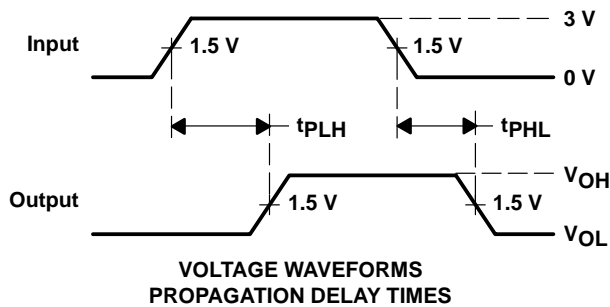
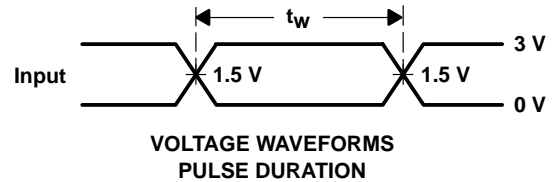
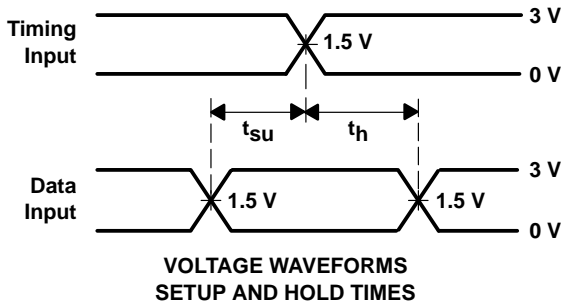
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PARAMETER MEASUREMENT INFORMATION



TEST	S1
t_{pd}	Open
t_{PLZ}/t_{PZL}	6 V
t_{PHZ}/t_{PZH}	GND



- NOTES:
- A. C_L includes probe and jig capacitance.
 - B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
 - C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
 - D. The outputs are measured one at a time with one transition per measurement.
 - E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - F. t_{PZL} and t_{PZH} are the same as t_{en} .
 - G. t_{PLH} and t_{PHL} are the same as t_{pd} .

Figure 3. Load Circuit and Voltage Waveforms

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