

# SN74ALB16245

## 3.3-V ALB 16-BIT TRANSCEIVER WITH 3-STATE OUTPUTS

SCBS678C – SEPTEMBER 1996 – REVISED JANUARY 2001

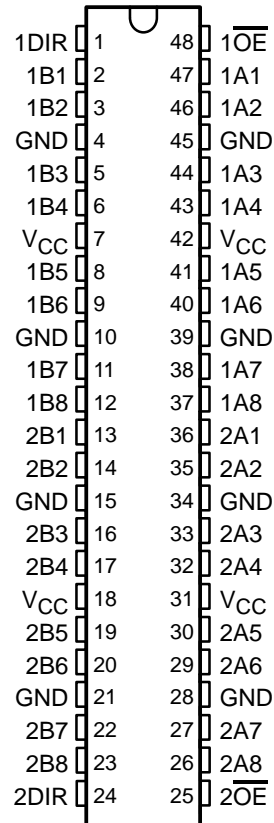
- Member of Texas Instruments' Widebus™ Family
- State-of-the-Art Advanced Low-Voltage BiCMOS (ALB) Technology Design for 3.3-V Operation
- Schottky Diodes on All Inputs to Eliminate Overshoot and Undershoot
- Industry Standard '16245 Pinout
- Distributed V<sub>CC</sub> and GND Pins Minimize High-Speed Switching Noise
- Flow-Through Architecture Optimizes PCB Layout

### description

The SN74ALB16245 is a 16-bit transceiver designed for high-speed, low-voltage (3.3-V) V<sub>CC</sub> operation. This device is intended to replace the conventional transceiver 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.

This device can be used as two 8-bit transceivers or one 16-bit transceiver. It allows data transmission from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable ( $\overline{OE}$ ) input can be used to disable the device so that the buses are effectively isolated.

### DGG, DGV, OR DL PACKAGE (TOP VIEW)



### ORDERING INFORMATION

TA	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	SSOP – DL	Tube	SN74ALB16245DL	ALB16245
		Tape and reel	SN74ALB16245DLR	
	TSSOP – DGG	Tape and reel	SN74ALB16245DGGR	ALB16245
	TVSOP – DGV	Tape and reel	SN74ALB16245DGVR	AV245

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



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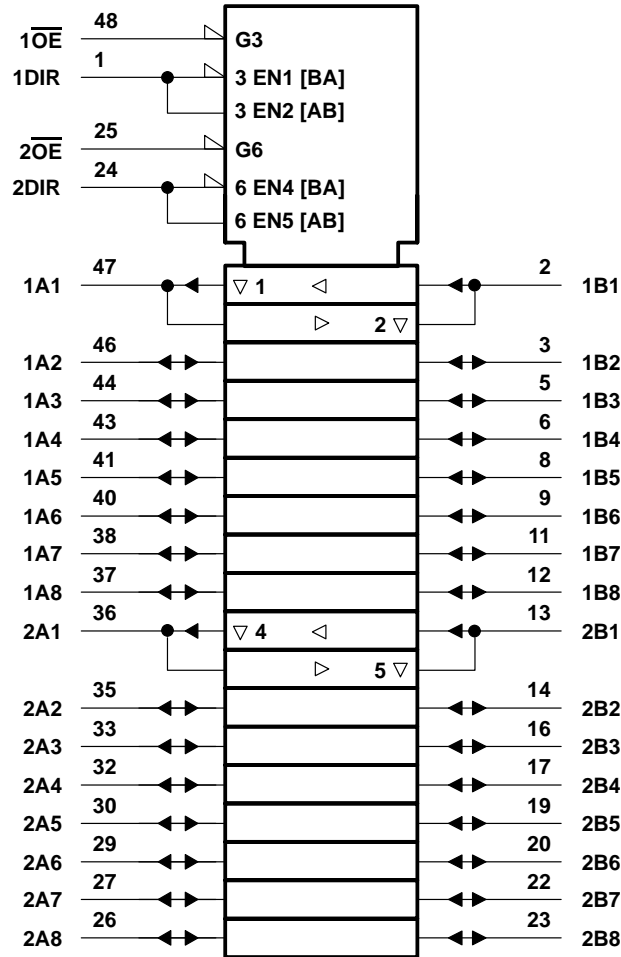
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**FUNCTION TABLE**  
 (each 8-bit section)

INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

logic symbol†



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



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

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT	
V <sub>IK</sub>	A or B ports	V <sub>CC</sub> = 3 V	I <sub>I</sub> = 18 mA		3.7	V <sub>CC</sub> +1.2	V	
			I <sub>I</sub> = -18 mA		-0.9	-1.2		
I <sub>I</sub>	Control inputs	V <sub>CC</sub> = 3.6 V,	V <sub>I</sub> = V <sub>CC</sub> or GND			±10	μA	
	A or B ports	V <sub>CC</sub> = 3.6 V	V <sub>I</sub> = V <sub>CC</sub>	$\overline{OE}$ low	0.4	0.6	mA	
				$\overline{OE}$ high		25	μA	
			V <sub>I</sub> = 0	$\overline{OE}$ low	-0.7	-1	mA	
$\overline{OE}$ high		-60		μA				
I <sub>OZH</sub>		V <sub>CC</sub> = 3.6 V,	V <sub>O</sub> = 3 V		0.7	20	μA	
I <sub>OZL</sub>		V <sub>CC</sub> = 3.6 V,	V <sub>O</sub> = 0.5 V		-0.2	-50	μA	
I <sub>CC</sub> /buffer		V <sub>CC</sub> = 3.6 V,	I <sub>O</sub> = 0,	V <sub>I</sub> = V <sub>CC</sub> or GND	3.7	5.6	mA	
I <sub>CCZ</sub>		V <sub>CC</sub> = 3.6 V,	Control inputs = V <sub>CC</sub> or GND			0.8	mA	
ΔI <sub>CC</sub> ‡		V <sub>CC</sub> = 3 V to 3.6 V, One input at V <sub>CC</sub> - 0.6 V, Other inputs at V <sub>CC</sub> or GND					600	μA
C <sub>i</sub>		V <sub>I</sub> = 3 V or 0			3.5		pF	
C <sub>io</sub>		V <sub>O</sub> = 3 V or 0			7.5		pF	

† All typical values are at V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25°C.

‡ This is the increase in supply current for each input that is at the specified TTL voltage level rather than V<sub>CC</sub> or GND.

**switching characteristics over recommended operating free-air temperature range, C<sub>L</sub> = 50 pF (unless otherwise noted) (see Figure 3)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 3.3 V ± 0.3 V			UNIT
			MIN	TYP†	MAX	
t <sub>pd</sub>	A or B	B or A	0.6	1.3	2	ns
t <sub>en</sub>	$\overline{OE}$	A or B	1.5	3.2	6	ns
t <sub>dis</sub>	$\overline{OE}$	A or B	1.8	2.8	4.2	ns

† All typical values are at V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25°C.



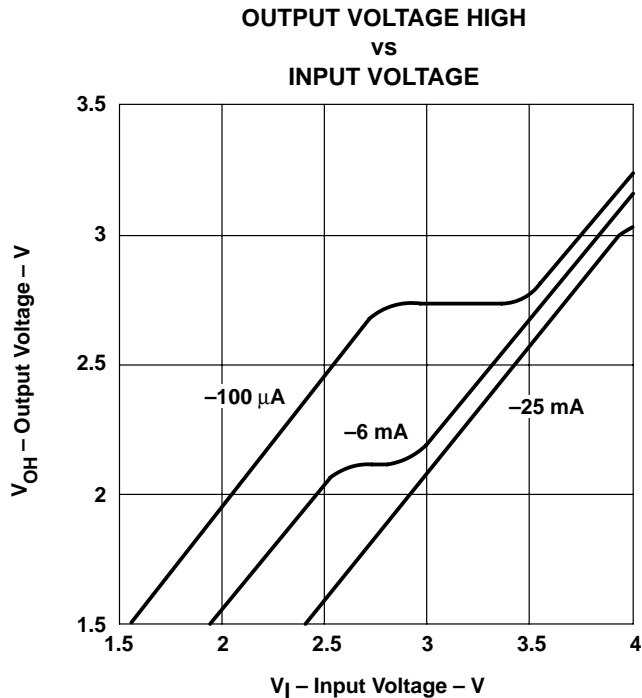


Figure 1. V<sub>OH</sub> Over Recommended Free-Air Temperature Range

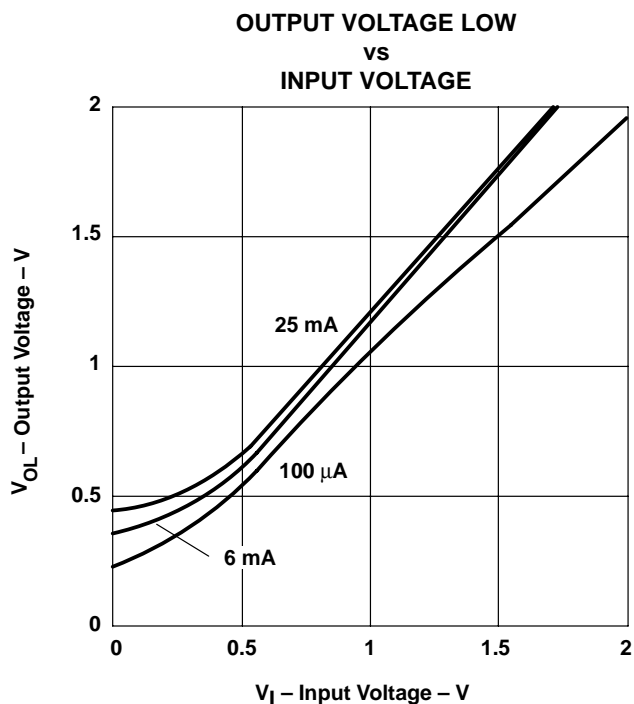
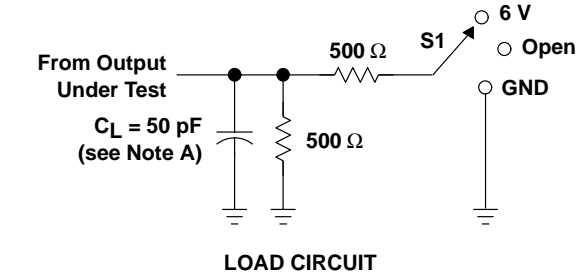


Figure 2. V<sub>OL</sub> Over Recommended Free-Air Temperature Range

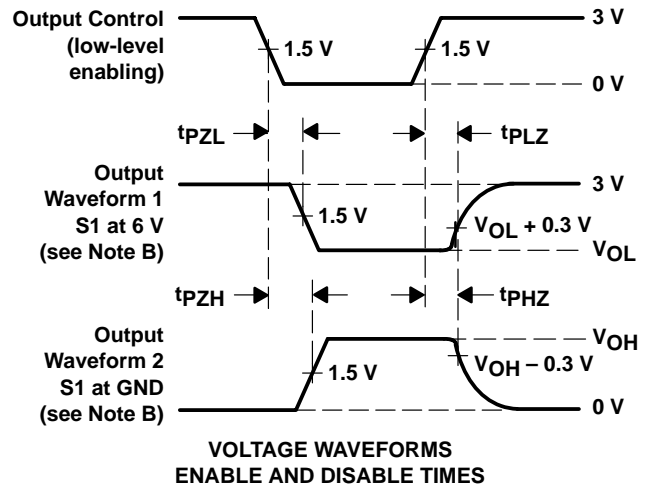
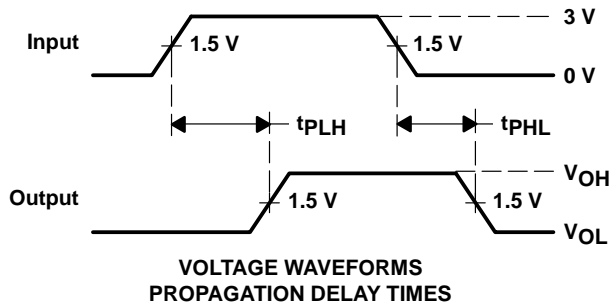
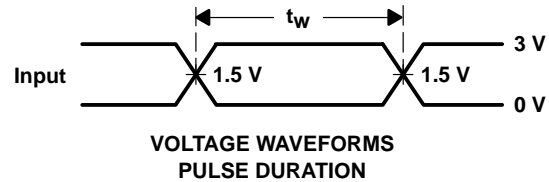
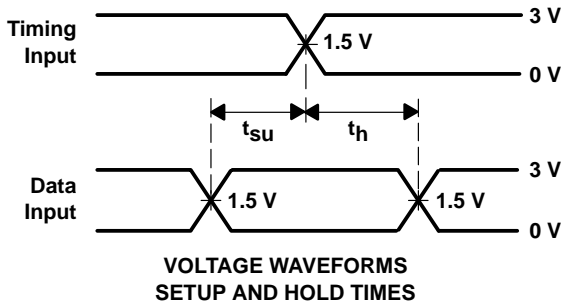
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**PARAMETER MEASUREMENT INFORMATION**



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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