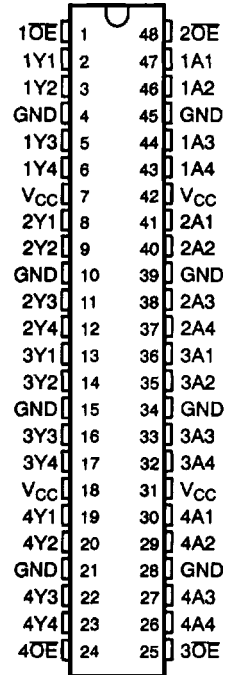


SN54ABT16244, SN74ABT16244 16-BIT BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

SCBS073B-D3711, SEPTEMBER 1991-REVISED OCTOBER 1992

- Members of the Texas Instruments *Widebus*™ Family
- State-of-the-Art *EPIC-IIB*™ BICMOS Design Significantly Reduces Power Dissipation
- Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17
- Typical V_{OLP} (Output Ground Bounce) < 1 V at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$
- Distributed V_{CC} and GND Pin Configuration Minimizes High-Speed Switching Noise
- Flow-Through Architecture Optimizes PCB Layout
- High-Drive Outputs ($-32\text{-mA } I_{OH}$, $64\text{-mA } I_{OL}$)
- Packaged in Plastic 300-mil Shrink Small-Outline (DL) and Thin Shrink Small-Outline (DGG) Packages and 380-mil Fine-Pitch Ceramic Flat Packages (WD) Using 25-mil Center-to-Center Spacings

SN54ABT16244 . . . WD PACKAGE
SN74ABT16244 . . . DGG OR DL PACKAGE
(TOP VIEW)



description

The 'ABT16244 is a 16-bit buffer and line driver designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. 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 \overline{OE} (active-low output-enable) inputs.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

The SN74ABT16244 is packaged in TI's shrink small-outline package (DL), which provides twice the I/O pin count and functionality of standard small-outline packages in the same printed-circuit-board area.

The SN54ABT16244 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ABT16244 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE
(each buffer)

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

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PRODUCTION DATA Information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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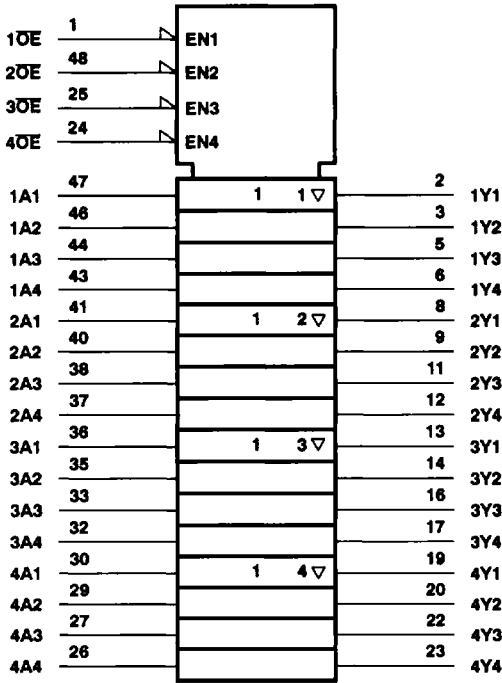
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16-BIT BUFFERS/DRIVERS

WITH 3-STATE OUTPUTS

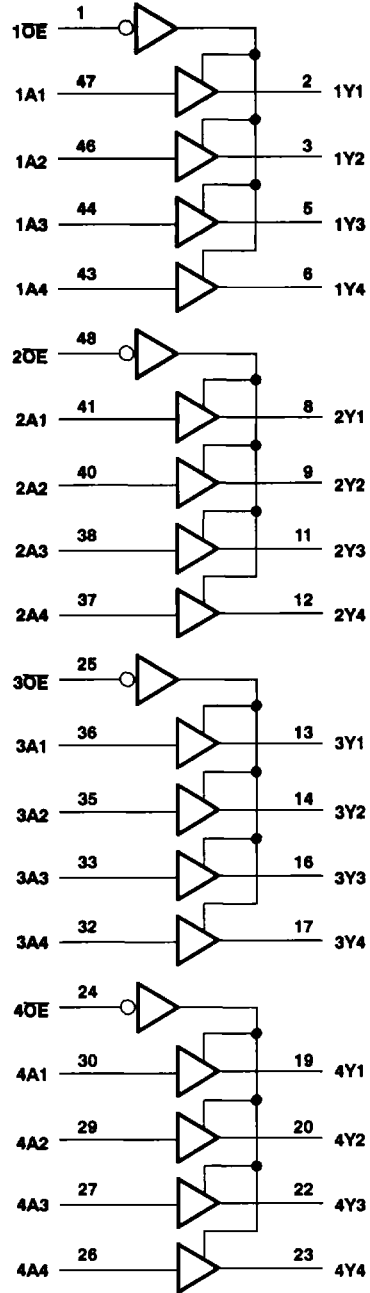
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logic symbol†



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

logic diagram (positive logic)



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16-BIT BUFFERS/DRIVERS
WITH 3-STATE OUTPUTS

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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V_{CC}	-0.5 V to 7 V
Input voltage range, V_I (see Note 1)	-0.5 V to 7 V
Voltage range applied to any output in the high state or power-off state, V_O	-0.5 V to 5.5 V
Current into any output in the low state, I_O : SN54ABT16244	96 mA
SN74ABT16244	128 mA
Input clamp current, I_{IK} ($V_I < 0$)	-18 mA
Output clamp current, I_{OK} ($V_O < 0$)	-50 mA
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air): DGG package	0.6 W
DL package	0.85 W
Storage temperature range	-65°C to 150°C

[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

recommended operating conditions (see Note 2)

		SN54ABT16244		SN74ABT16244		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V_{IH}	High-level input voltage	2		2		V
V_{IL}	Low-level input voltage		0.8		0.8	V
V_I	Input voltage	0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current		-24		-32	mA
I_{OL}	Low-level output current		48		64	mA
$\Delta V/\Delta v$	Input transition rise or fall rate	Outputs enabled		10	10	ns/V
T_A	Operating free-air temperature	-55	125	-40	85	°C

NOTE 2: Unused or floating inputs must be held high or low.



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16-BIT BUFFERS/DRIVERS

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

PARAMETER	TEST CONDITIONS		$T_A = 25^\circ\text{C}$			SN54ABT16244		SN74ABT16244		UNIT
			MIN	TYP†	MAX	MIN	MAX	MIN	MAX	
V_{IK}	$V_{CC} = 4.5\text{ V}, I_I = -18\text{ mA}$				-1.2				-1.2	V
V_{OH}	$V_{CC} = 4.5\text{ V}, I_{OH} = -3\text{ mA}$		2.5			2.5		2.5		V
	$V_{CC} = 5\text{ V}, I_{OH} = -3\text{ mA}$		3			3		3		
	$V_{CC} = 4.5\text{ V}, I_{OH} = -24\text{ mA}$		2			2				
	$V_{CC} = 4.5\text{ V}, I_{OH} = -32\text{ mA}$		2‡					2		
V_{OL}	$V_{CC} = 4.5\text{ V}, I_{OL} = 48\text{ mA}$		0.55			0.55				V
	$V_{CC} = 4.5\text{ V}, I_{OL} = 64\text{ mA}$		0.55‡					0.55		
I_I	$V_{CC} = 5.5\text{ V}, V_I = V_{CC}\text{ or GND}$		± 1			± 1		± 1		μA
I_{OZH} §	$V_{CC} = 5.5\text{ V}, V_O = 2.7\text{ V}$		50			50		50		μA
I_{OZL} §	$V_{CC} = 5.5\text{ V}, V_O = 0.5\text{ V}$		-50			-50		-50		μA
I_{OFF}	$V_{CC} = 0\text{ V}, V_I\text{ or }V_O \leq 4.5\text{ V}$		± 100					± 100		μA
I_{CEX}	$V_{CC} = 5.5\text{ V}, V_O = 5.5\text{ V}$		Outputs high		50		50		50	
I_O †	$V_{CC} = 5.5\text{ V}, V_O = 2.5\text{ V}$		-50	-100	-180	-50	-180	-50	-180	mA
I_{CC}	$V_{CC} = 5.5\text{ V}, V_I = V_{CC}\text{ or GND}, I_O = 0,$		Outputs high		2		2		2	
			Outputs low		32		32		32	
			Outputs disabled		2		2		2	
ΔI_{CC} ¶	$V_{CC} = 5.5\text{ V},$ One input at 3.4 V, Other inputs at V_{CC} or GND		Data inputs		Outputs enabled		1		1.5	
					Outputs disabled		0.05		1	
			Control inputs				1.5		1.5	
C_I	$V_I = 2.5\text{ V or }0.5\text{ V}$		7.5							pF
C_O	$V_O = 2.5\text{ V or }0.5\text{ V}$		7							pF

† All typical values are at $V_{CC} = 5\text{ V}$.

‡ On products compliant to MIL-STD-883, Class B, this parameter does not apply.

§ The parameters I_{OZH} and I_{OZL} include the input leakage current.

¶ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

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

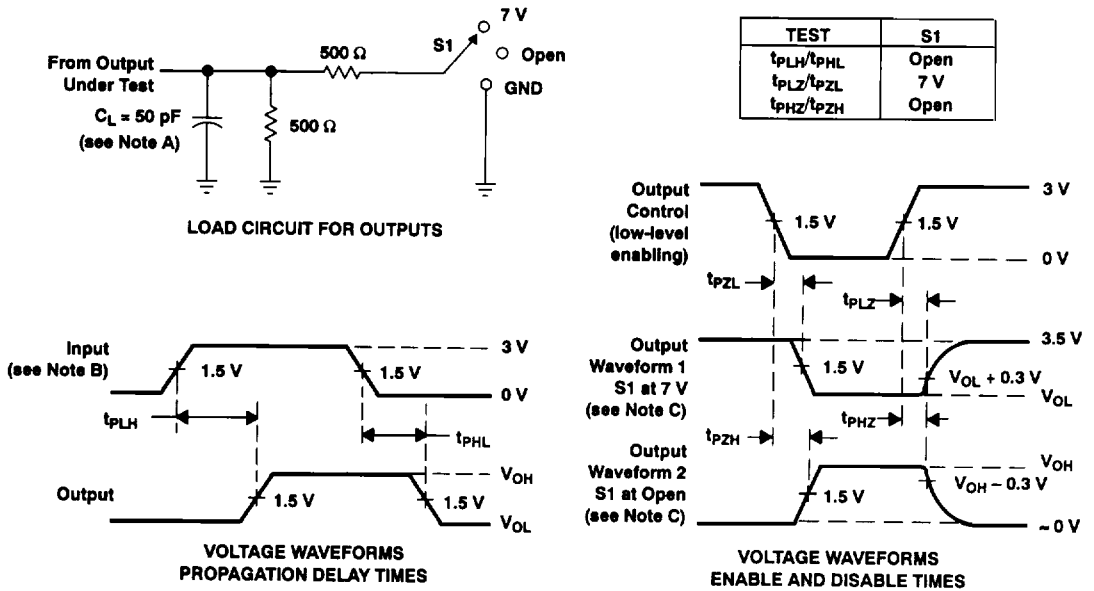
switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L = 50\text{ pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5\text{ V}, T_A = 25^\circ\text{C}$			SN54ABT16244		SN74ABT16244		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1	2.3	3.2	1	3.6	1	3.5	ns
t_{PHL}			1	2.3	3.7	1	4.2	1	4.1	
t_{PZH}	OE	Y	1	2.6	3.8	1	4.9	1	4.6	ns
t_{PZL}			1	2.9	5.5	1	6.5	1	6.2	
t_{PHZ}	OE	Y	1.7	3.8	4.7	1.7	6	1.7	5.6	ns
t_{PLZ}			1.5	3.2	4.7	1.5	5.7	1.5	5.6	

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PARAMETER MEASUREMENT INFORMATION



- NOTES: A. C_L includes probe and jig capacitance.
- B. All input pulses are supplied by generators having the following characteristics: PRR $\leq 10 \text{ MHz}$, $Z_o = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
- C. 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.
- D. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms