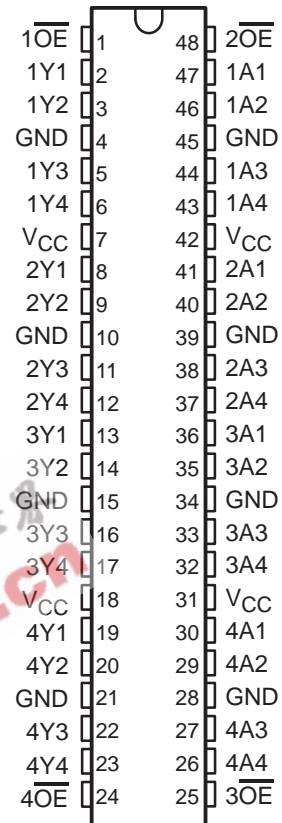


# SN54ACT16244, 74ACT16244 16-BIT BUFFERS/LINE DRIVERS WITH 3-STATE OUTPUTS

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- Members of the Texas Instruments *Widebus*™ Family
- Inputs Are TTL-Voltage Compatible
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Flow-Through Architecture Optimizes PCB Layout
- Distributed V<sub>CC</sub> and GND Pin Configurations Minimize High-Speed Switching Noise
- *EPIC*™ (Enhanced-Performance Implanted CMOS) 1-μm Process
- 500-mA Typical Latch-Up Immunity at 125°C
- Package Options Include Plastic Shrink Small-Outline (DL) and Thin Shrink Small-Outline (DGG) Packages, and 380-mil Fine-Pitch Ceramic Flat (WD) Packages Using 25-mil Center-to-Center Pin Spacings

SN54ACT16244 . . . WD PACKAGE  
74ACT16244 . . . DGG OR DL PACKAGE  
(TOP VIEW)



## description

The SN54ACT16244 and 74ACT16244 are 16-bit buffers/line drivers designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. They can be used as four 4-bit buffers, two 8-bit buffers, or one 16-bit buffer. The devices provide true outputs and symmetrical  $\overline{OE}$  (active-low) output-enable inputs.

The 74ACT16244 is packaged in TI's shrink small-outline package, which provides twice the I/O pin count and functionality of standard small-outline packages in the same printed-circuit-board area.

The SN54ACT16244 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The 74ACT16244 is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .

FUNCTION TABLE  
(each driver)

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



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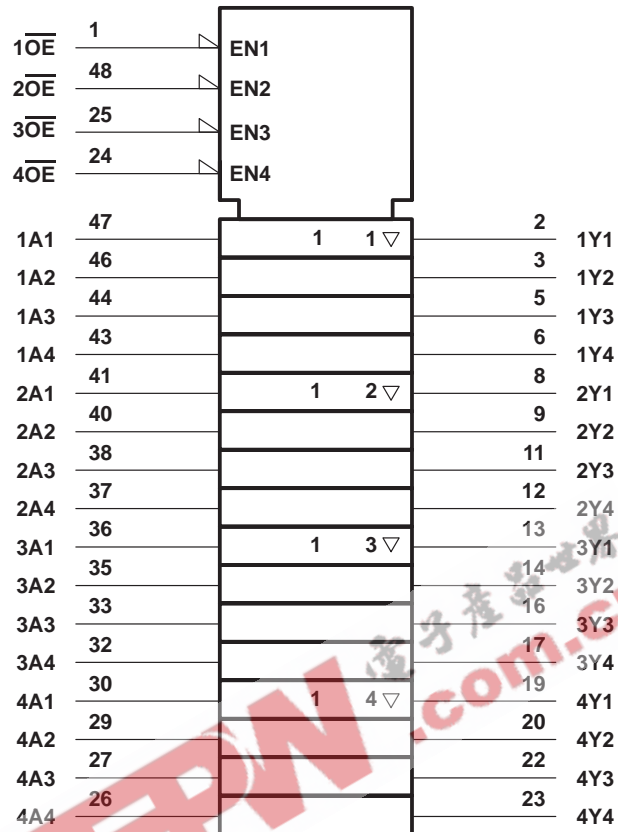
# SN54ACT16244, 74ACT16244

## 16-BIT BUFFERS/LINE DRIVERS

### WITH 3-STATE OUTPUTS

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#### logic symbol†

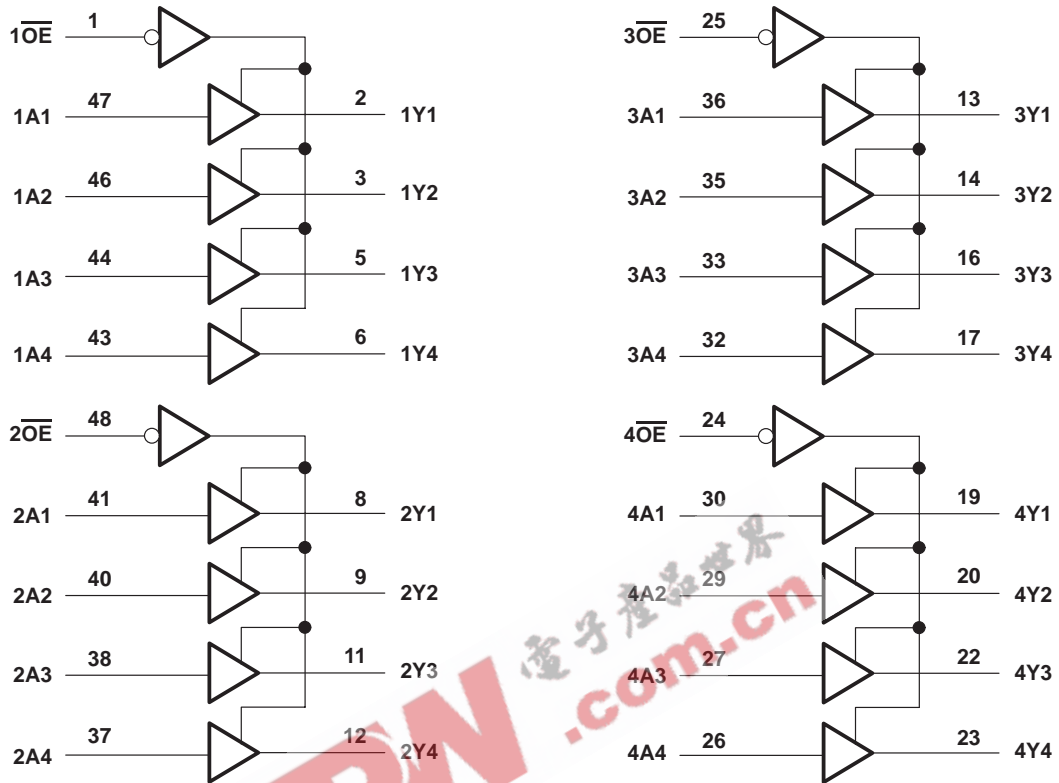


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

# SN54ACT16244, 74ACT16244 16-BIT BUFFERS/LINE DRIVERS WITH 3-STATE OUTPUTS

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## logic diagram (positive logic)



## 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 $V_{CC} + 0.5$ V
Output voltage range, $V_O$ (see Note 1) .....	-0.5 V to $V_{CC} + 0.5$ V
Input clamp current, $I_{IK}$ ( $V_I < 0$ or $V_I > V_{CC}$ ) .....	$\pm 20$ mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ ) .....	$\pm 50$ mA
Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ ) .....	$\pm 50$ mA
Continuous current through $V_{CC}$ or GND .....	$\pm 400$ mA
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2): DGG package .....	0.85 W
DL package .....	1.2 W
Storage temperature range, $T_{stg}$ .....	$-65^\circ\text{C}$ to $150^\circ\text{C}$

† 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.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
2. The maximum package power dissipation is calculated using a junction temperature of  $150^\circ\text{C}$  and a board trace length of 750 mils.

# SN54ACT16244, 74ACT16244 16-BIT BUFFERS/LINE DRIVERS WITH 3-STATE OUTPUTS

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## recommended operating conditions (see Note 3)

	SN54ACT16244		74ACT16244		UNIT
	MIN	MAX	MIN	MAX	
V <sub>CC</sub> Supply voltage (see Note 4)	4.5	5.5	4.5	5.5	V
V <sub>IH</sub> High-level input voltage	2		2		V
V <sub>IL</sub> Low-level input voltage		0.8		0.8	V
V <sub>I</sub> Input voltage	0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
V <sub>O</sub> Output voltage	0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
I <sub>OH</sub> High-level output current		-24		-24	mA
I <sub>OL</sub> Low-level output current		24		24	mA
Δt/Δv Input transition rise or fall rate	0	10	0	10	ns/V
T <sub>A</sub> Operating free-air temperature	-55	125	-40	85	°C

NOTES: 3. Unused inputs should be tied to V<sub>CC</sub> through a pullup resistor of approximately 5 kΩ or greater to prevent them from floating.  
4. All V<sub>CC</sub> and GND pins must be connected to the proper voltage supply.

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54ACT16244		74ACT16244		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = -50 μA	4.5 V	4.4			4.4		4.4	V	
		5.5 V	5.4			5.4		5.4		
	I <sub>OH</sub> = -24 mA	4.5 V	3.94			3.7		3.8		
		5.5 V	4.94			4.7		4.8		
	I <sub>OH</sub> = -50 mA <sup>†</sup>	5.5 V				3.85				
I <sub>OH</sub> = -75 mA <sup>†</sup>	5.5 V						3.85			
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	4.5 V			0.1		0.1	0.1	V	
		5.5 V			0.1		0.1	0.1		
	I <sub>OL</sub> = 24 mA	4.5 V			0.36		0.5	0.44		
		5.5 V			0.36		0.5	0.44		
	I <sub>OL</sub> = 50 mA <sup>†</sup>	5.5 V					1.65			
I <sub>OL</sub> = 75 mA <sup>†</sup>	5.5 V						1.65			
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5.5 V			±0.1		±1	±1	μA	
I <sub>OZ</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	5.5 V			±0.5		±10	±5	μA	
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	5.5 V			8		160	80	μA	
ΔI <sub>CC</sub> <sup>‡</sup>	One input at 3.4 V, Other inputs at GND or V <sub>CC</sub>	5.5 V			0.9		1	1	mA	
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V		4.5					pF	
C <sub>o</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	5 V		13.5					pF	

<sup>†</sup> Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

<sup>‡</sup> This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or V<sub>CC</sub>.

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switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN54ACT16244					UNIT
			T <sub>A</sub> = 25°C			MIN	MAX	
			MIN	TYP	MAX			
t <sub>PLH</sub>	A	Y	4	6.5	8.5	3	10.3	ns
t <sub>PHL</sub>			3.4	6.3	8.7	3.4	10.1	
t <sub>PZH</sub>	OE	Y	3	5.8	8.1	3	10.5	ns
t <sub>PZL</sub>			3.7	6.7	9.3	3.7	11	
t <sub>PHZ</sub>	$\overline{\text{OE}}$	Y	5.4	8.1	11.5	5.4	13	ns
t <sub>PLZ</sub>			5	7.5	9.5	5	10.9	

switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	74ACT16244					UNIT
			T <sub>A</sub> = 25°C			MIN	MAX	
			MIN	TYP	MAX			
t <sub>PLH</sub>	A	Y	4	6.5	8.5	4	9.4	ns
t <sub>PHL</sub>			3.4	6.3	8.7	3.4	9.5	
t <sub>PZH</sub>	$\overline{\text{OE}}$	Y	3	5.8	8.1	3	8.9	ns
t <sub>PZL</sub>			3.7	6.7	9.3	3.7	10.3	
t <sub>PHZ</sub>	$\overline{\text{OE}}$	Y	5.4	8.1	10.3	5.4	11.3	ns
t <sub>PLZ</sub>			5	7.5	9.5	5	10.3	

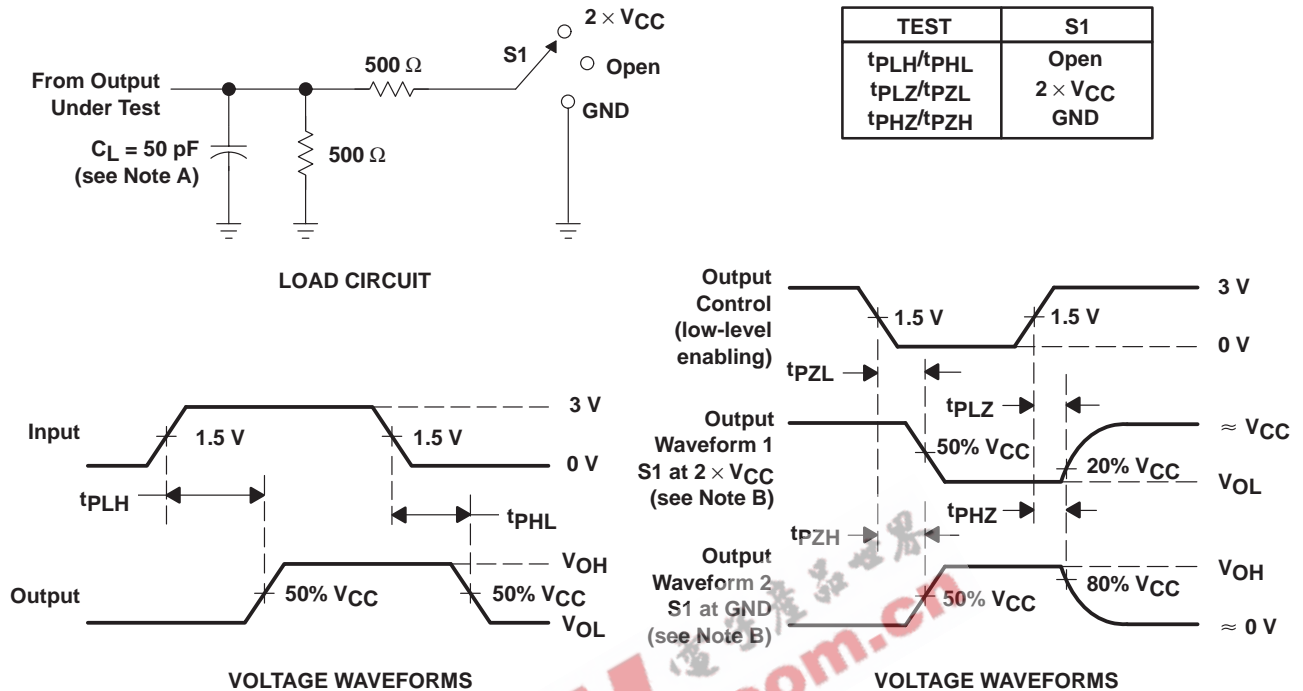
operating characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C

PARAMETER		TEST CONDITIONS	TYP	UNIT
C <sub>pd</sub>	Power dissipation capacitance	C <sub>L</sub> = 50 pF, f = 1 MHz	39	pF
			11	

# SN54ACT16244, 74ACT16244 16-BIT BUFFERS/LINE DRIVERS WITH 3-STATE OUTPUTS

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## PARAMETER MEASUREMENT INFORMATION



- NOTES:
- $C_L$  includes probe and jig capacitance.
  - 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.
  - All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r = 3 \text{ ns}$ ,  $t_f = 3 \text{ ns}$ .
  - The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

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