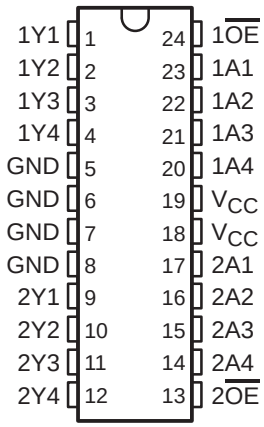
74AC11244
OCTAL BUFFER/DRIVER WITH 3-STATE OUTPUTS

SCAS171B – MARCH 1987 – REVISED SEPTEMBER 1998

- ***EPIC***™ **(Enhanced-Performance Implanted CMOS) 1-μm Process**
- **3-State Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin V_{CC} and GND Pin Configurations Minimize High-Speed Switching Noise**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, and Standard Plastic DIPs (NT)**

DB, DW, NT, OR PW PACKAGE
(TOP VIEW)



description

The 74AC11244 is an octal buffer or 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 two 4-bit buffers or one 8-bit buffer, with active-low output-enable ($\overline{OE}$) inputs.

When $\overline{OE}$ is low, the device passes noninverted data from the A inputs to the Y outputs. When $\overline{OE}$ is high, the outputs are in the high-impedance state.

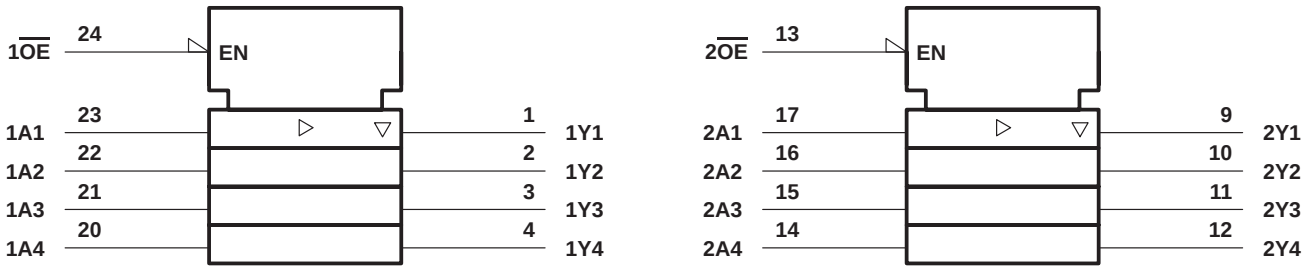
To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

The 74AC11244 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE
(each driver)

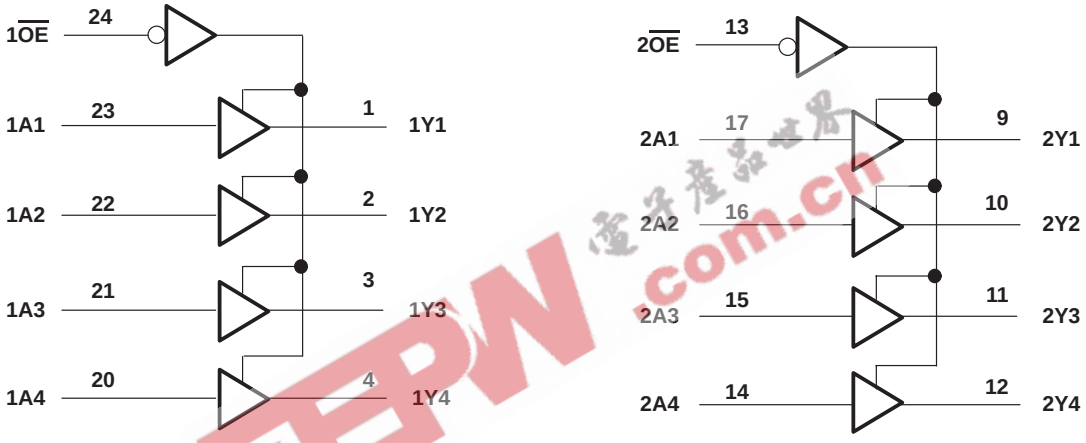
INPUTS		OUTPUT
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

logic symbol†



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

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}) . . . . . ±20 mA
Output clamp current, I_{OK} (V_O < 0 or V_O > V_{CC}) . . . . . ±50 mA
Continuous output current, I_O (V_O = 0 to V_{CC}) . . . . . ±50 mA
Continuous current through V_{CC} or GND . . . . . ±200 mA
Package thermal impedance, θ_{JA} (see Note 2): DB package . . . . . 104°C/W
DW package . . . . . 81°C/W
PW package . . . . . 120°C/W
NT package . . . . . 67°C/W
Storage temperature range, T_{stg} . . . . . –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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The package thermal impedance is calculated in accordance with JESD 51, except for through-hole packages, which use a trace length of zero.

recommended operating conditions (see Note 3)

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		3	5	5.5	V
V_{IH}	High-level input voltage	V_{CC} = 3 V	2.1			V
		V_{CC} = 4.5 V	3.15			
		V_{CC} = 5.5 V	3.85			
V_{IL}	Low-level input voltage	V_{CC} = 3 V			0.9	V
		V_{CC} = 4.5 V			1.35	
		V_{CC} = 5.5 V			1.65	
V_I	Input voltage		0		V_{CC}	V
V_O	Output voltage		0		V_{CC}	V
I_{OH}	High-level output current	V_{CC} = 3 V			–4	mA
		V_{CC} = 4.5 V			–24	
		V_{CC} = 5.5 V			–24	
I_{OL}	Low-level output current	V_{CC} = 3 V			12	mA
		V_{CC} = 4.5 V			24	
		V_{CC} = 5.5 V			24	
$\Delta t/\Delta v$	Input transition rise or fall rate		0		10	ns/V
T_A	Operating free-air temperature		–40		85	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
V_{OH}	I_{OH} = –50 µA	3 V	2.9			2.9		V
		4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
	I_{OH} = –4 mA	3 V	2.58			2.48		
	I_{OL} = –24 mA	4.5 V	3.94			3.8		
		5.5 V	4.94			4.8		
	I_{OH} = –75 mA†	5.5 V				3.85		
V_{OL}	I_{OL} = 50 µA	3 V			0.1		0.1	V
		4.5 V			0.1		0.1	
		5.5 V			0.1		0.1	
	I_{OL} = 12 mA	3 V			0.36		0.44	
	I_{OL} = 24 mA	4.5 V			0.36		0.44	
		5.5 V			0.36		0.44	
	I_{OL} = 75 mA†	5.5 V					1.65	
I_I	V_I = V_{CC} or GND	5.5 V			±0.1		±1	µA
I_{OZ}	V_O = V_{CC} or GND	5.5 V			±0.5		±5	µA
I_{CC}	V_I = V_{CC} or GND, I_O = 0	5.5 V			8		80	µA
C_i	V_I = V_{CC} or GND	5 V		4				pF
C_o	V_O = V_{CC} or GND	5 V		10				pF

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

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A	Y	1.5	7.1	9.3	1.5	10.2	ns
t_{PHL}			1.5	6.3	8.6	1.5	9.5	
t_{PZH}	$\overline{OE}$	Y	1.5	8	10.7	1.5	11.8	ns
t_{PZL}			1.5	7.9	10.6	1.5	11.9	
t_{PHZ}	$\overline{OE}$	Y	1.5	5.9	7.9	1.5	8.3	ns
t_{PLZ}			1.5	7.2	9.4	1.5	9.9	

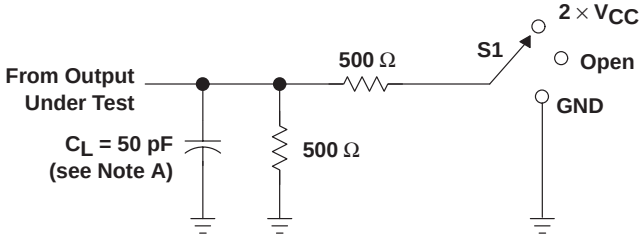
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A	Y	1.5	4.9	6.7	1.5	7.3	ns
t_{PHL}			1.5	4.5	6.4	1.5	6.9	
t_{PZH}	$\overline{OE}$	Y	1.5	5.4	7.7	1.5	8.5	ns
t_{PZL}			1.5	5.4	7.6	1.5	8.5	
t_{PHZ}	$\overline{OE}$	Y	1.5	5.2	7	1.5	7.3	ns
t_{PLZ}			1.5	5.8	7.8	1.5	8.2	

operating characteristics, V_{CC} = 5 V, T_A = 25°C

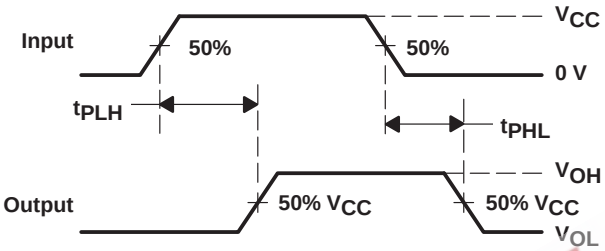
PARAMETER			TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance per buffer/driver	Outputs enabled	C_L = 50 pF,	f = 1 MHz	27	pF
		Outputs disabled			9	

PARAMETER MEASUREMENT INFORMATION

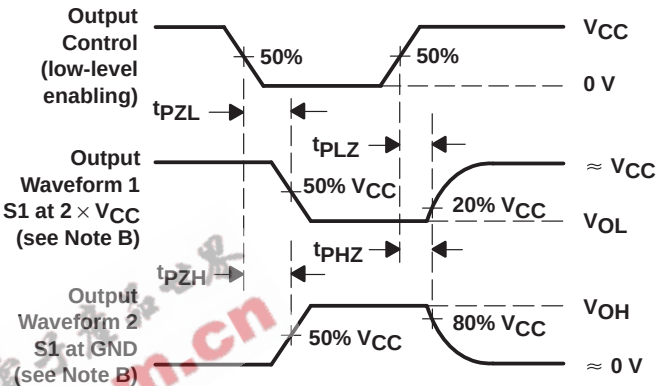


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	2 × V_{CC}
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT



VOLTAGE WAVEFORMS



VOLTAGE WAVEFORMS

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 ≤ 1 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
D. 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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