- *EPIC*™ **(Enhanced-Performance Implanted CMOS) 1-µm Process**
- **Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, Ceramic Chip Carriers (FK), Flat (W), and DIP (J, N) Packages**
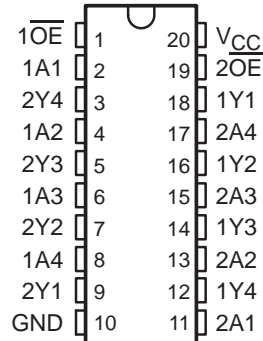
description

These octal buffers and line drivers are designed specifically to improve the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.
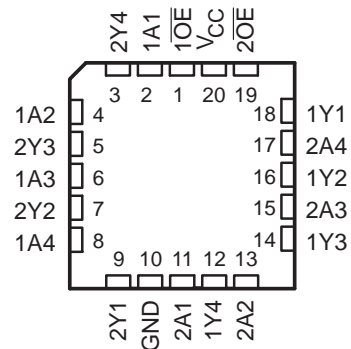
The 'AC244 are organized as two 4-bit buffers/drivers with separate output-enable ($\overline{OE}$) inputs. When $\overline{OE}$ is low, the device passes noninverted data from the A inputs to the Y outputs. When $\overline{OE}$ is high, the outputs are in the high-impedance state.

The SN54AC244 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74AC244 is characterized for operation from –40°C to 85°C.

SN54AC244 . . . J OR W PACKAGE
SN74AC244 . . . DB, DW, N, OR PW PACKAGE
(TOP VIEW)

1$\overline{OE}$	1	20	V$_{CC}$
1A1	2	19	2$\overline{OE}$
2Y4	3	18	1Y1
1A2	4	17	2A4
2Y3	5	16	1Y2
1A3	6	15	2A3
2Y2	7	14	1Y3
1A4	8	13	2A2
2Y1	9	12	1Y4
GND	10	11	2A1

SN54AC244 . . . FK PACKAGE
(TOP VIEW)

Top pins: 2Y4, 1A1, 1$\overline{OE}$, V$_{CC}$, 2$\overline{OE}$ (3, 2, 1, 20, 19)

1A2	4	18	1Y1
2Y3	5	17	2A4
1A3	6	16	1Y2
2Y2	7	15	2A3
1A4	8	14	1Y3

Bottom pins: 2Y1, GND, 2A1, 1Y4, 2A2 (9, 10, 11, 12, 13)

FUNCTION TABLE
(each buffer)

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

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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TEXAS INSTRUMENTS

SN54AC244, SN74AC244
OCTAL BUFFERS/DRIVERS
WITH 3-STATE OUTPUTS
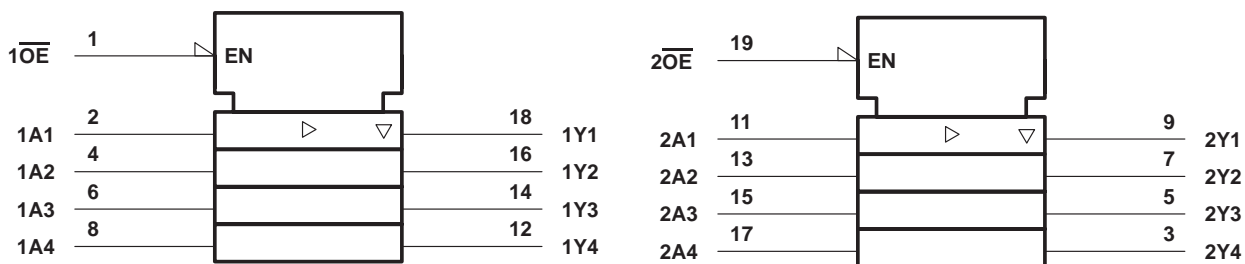
logic symbol†

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

logic diagram (positive Logic)
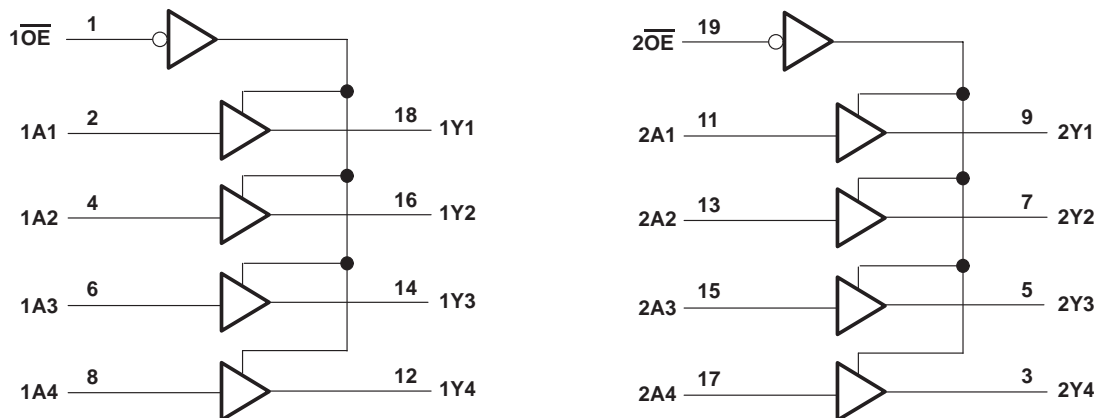
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

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 $V_O > V_{CC}$) .... ±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC}) .... ±50 mA
Continuous current through V_{CC} or GND .... ±200 mA
Maximum power dissipation at $T_A = 55°C$ (in still air) (see Note 2): DB package .... 0.6 W
DW package .... 1.6 W
N package .... 1.3 W
PW package .... 0.7 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 maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils,
   except for the N package, which has a trace length of zero.

recommended operating conditions (see Note 3)

			SN54AC244		SN74AC244		UNIT
			MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage		2	6	2	6	V
V_{IH}	High-level input voltage	$V_{CC} = 3$ V	2.1		2.1		V
		$V_{CC} = 4.5$ V	3.15		3.15		
		$V_{CC} = 5.5$ V	3.85		3.85		
V_{IL}	Low-level input voltage	$V_{CC} = 3$ V		0.9		0.9	V
		$V_{CC} = 4.5$ V		1.35		1.35	
		$V_{CC} = 5.5$ V		1.65		1.65	
V_I	Input voltage		0	V_{CC}	0	V_{CC}	V
V_O	Output voltage		0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current	$V_{CC} = 3$ V		−12		−12	mA
		$V_{CC} = 4.5$ V		−24		−24	
		$V_{CC} = 5.5$ V		−24		−24	
I_{OL}	Low-level output current	$V_{CC} = 3$ V		12		12	mA
		$V_{CC} = 4.5$ V		24		24	
		$V_{CC} = 5.5$ V		24		24	
$\Delta t/\Delta v$	Input transition rise or fall rate		0	8	0	8	ns/V
T_A	Operating free-air temperature		−55	125	−40	85	°C

NOTE 3: Unused inputs must be held high or low to prevent them from floating.

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

PARAMETER		TEST CONDITIONS	V_{CC}	$T_A = 25°C$			SN54AC244		SN74AC244		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}		$I_{OH} = -50\ \mu A$	3 V	2.9			2.9		2.9		V
			4.5 V	4.4			4.4		4.4		
			5.5 V	5.4			5.4		5.4		
		$I_{OH} = -12\ mA$	3 V	2.56			2.4		2.46		
		$I_{OL} = -24\ mA$	4.5 V	3.86			3.7		3.76		
			5.5 V	4.86			4.7		4.76		
		$I_{OH} = -50\ mA†$	5.5 V				3.85				
		$I_{OH} = -75\ mA†$	5.5 V						3.85		
V_{OL}		$I_{OL} = 50\ \mu A$	3 V			0.1		0.1		0.1	V
			4.5 V			0.1		0.1		0.1	
			5.5 V			0.1		0.1		0.1	
		$I_{OL} = 12\ mA$	3 V			0.36		0.5		0.44	
		$I_{OL} = 24\ mA$	4.5 V			0.36		0.5		0.44	
			5.5 V			0.36		0.5		0.44	
		$I_{OL} = 50\ mA†$	5.5 V					1.65			
		$I_{OL} = 75\ mA†$	5.5 V							1.65	
I_I	Data inputs	$V_I = V_{CC}$ or GND	5.5 V		±0.1			±1		±1	μA
	Control inputs	$V_I = V_{CC}$ or GND			±0.1			±1		±1	
I_{OZ}		$V_O = V_{CC}$ or GND, $V_{I(OE)} = V_{IL}$ or V_{IH}	5.5 V		±0.25			±5		±2.5	μA
I_{CC}		$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V		4			80		40	μA
C_i		$V_I = V_{CC}$ or GND	5 V		2.5						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, $V_{CC} = 3.3\ V \pm 0.3\ V$ (unless otherwise noted) (see Figure 1)

| PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25°C$			SN54AC244		SN74AC244		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	2	6.5	9	1	12.5	1.5	10	ns
t_{PHL}			2	6.5	9	1	12	2	10	
t_{PZH}	$\overline{OE}$	Y	2	6	10.5	1	11.5	1.5	11	ns
t_{PZL}			2.5	7.5	10	1	13	2	11	
t_{PHZ}	$\overline{OE}$	Y	3	7	10	1	12.5	1.5	10.5	ns
t_{PLZ}			2.5	7.5	10.5	1	13	2.5	11.5	

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			SN54AC244		SN74AC244		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.5	5	7	1	9.5	1	7.5	ns
t_{PHL}			1.5	5	7	1	9	1	7.5	
t_{PZH}	$\overline{OE}$	Y	1.5	5	7	1	9	1.5	8	ns
t_{PZL}			1.5	5.5	8	1	10.5	1.5	8.5	
t_{PHZ}	$\overline{OE}$	Y	2.5	6.5	9	1	10.5	1	9.5	ns
t_{PLZ}			2	6.5	9	1	11	2	9.5	

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

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance per buffer/driver	C_L = 50 pF, f = 1 MHz	45	pF

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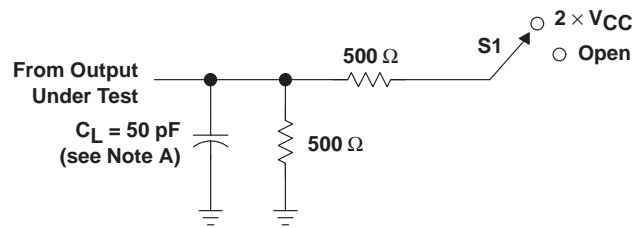
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	2 × V_{CC}
t_{PHZ}/t_{PZH}	Open

LOAD CIRCUIT
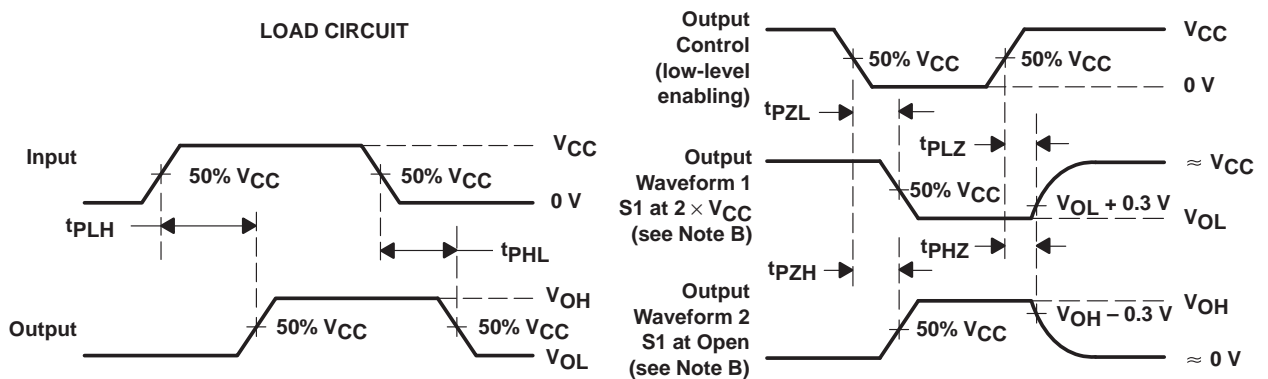
VOLTAGE WAVEFORMS

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 ≤ 2.5 ns, t_f ≤ 2.5 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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