

# SN54HCT244, SN74HCT244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

SCLS175B – MARCH 1984 – REVISED MAY 1997

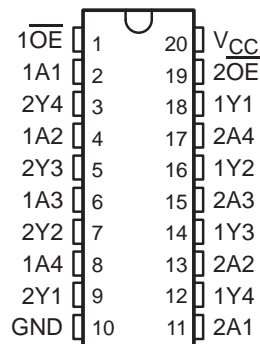
- Inputs Are TTL-Voltage Compatible
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- High-Current Outputs Drive up to 15 LSTTL Loads
- Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), Thin Shrink Small-Outline (PW), and Ceramic Flat (W) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

## description

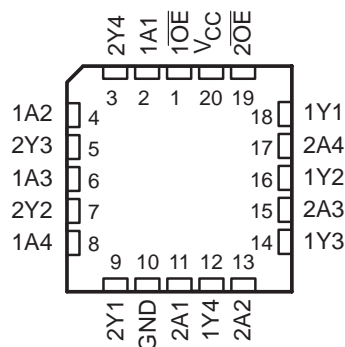
These octal buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The 'HCT244 are organized as two 4-bit buffers/drivers with separate output-enable ( $\overline{OE}$ ) 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 SN54HCT244 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74HCT244 is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .

SN54HCT244 . . . J OR W PACKAGE  
SN74HCT244 . . . DB, DW, N, OR PW PACKAGE  
(TOP VIEW)



SN54HCT244 . . . FK PACKAGE  
(TOP VIEW)



FUNCTION TABLE  
(each buffer/driver)

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

 **TEXAS  
INSTRUMENTS**

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## recommended operating conditions

		SN54HCT244			SN74HCT244			UNIT	
		MIN	NOM	MAX	MIN	NOM	MAX		
$V_{CC}$	Supply voltage	4.5	5	5.5	4.5	5	5.5	V	
$V_{IH}$	High-level input voltage	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$		2	2		V		
$V_{IL}$	Low-level input voltage	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$		0	0.8		V		
$V_I$	Input voltage	0	$V_{CC}$		0	$V_{CC}$		V	
$V_O$	Output voltage	0	$V_{CC}$		0	$V_{CC}$		V	
$t_t$	Input transition (rise and fall) time	0	500		0	500		ns	
$T_A$	Operating free-air temperature	-55		125		-40		85	°C

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

PARAMETER	TEST CONDITIONS	$V_{CC}$	$T_A = 25^\circ\text{C}$			SN54HCT244		SN74HCT244		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$	4.5 V	$I_{OH} = -20\ \mu\text{A}$		4.4	4.499	4.4	4.4	V	
			$I_{OH} = -6\ \text{mA}$		3.98	4.3	3.7	3.84		
$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$	4.5 V	$I_{OL} = 20\ \mu\text{A}$		0.001		0.1	0.1	V	
			$I_{OL} = 6\ \text{mA}$		0.17	0.26	0.4	0.33		
$I_I$	$V_I = V_{CC}$ or 0	5.5 V	$\pm 0.1$	$\pm 100$	$\pm 1000$	$\pm 1000$	nA			
$I_{OZ}$	$V_O = V_{CC}$ or 0, $V_I = V_{IH}$ or $V_{IL}$	5.5 V	$\pm 0.01$	$\pm 0.5$	$\pm 10$	$\pm 5$	$\mu\text{A}$			
$I_{CC}$	$V_I = V_{CC}$ or 0, $I_O = 0$	5.5 V	8		160	80	$\mu\text{A}$			
$\Delta I_{CC}^\dagger$	One input at 0.5 V or 2.4 V, Other inputs at 0 or $V_{CC}$	5.5 V	1.4	2.4	3	2.9	mA			
$C_i$		4.5 V to 5.5 V	3	10	10	10	pF			

† 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  $V_{CC}$ .

## switching characteristics over recommended operating free-air temperature range, $C_L = 50\ \text{pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			SN54HCT244		SN74HCT244		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	Y	4.5 V	15	28	42	35	ns			
			5.5 V	13	25	38	32				
$t_{en}$	$\overline{OE}$	Y	4.5 V	21	35	53	44	ns			
			5.5 V	19	32	48	40				
$t_{dis}$	$\overline{OE}$	Y	4.5 V	19	35	53	44	ns			
			5.5 V	18	32	48	40				
$t_t$		Y	4.5 V	8	12	18	15	ns			
			5.5 V	7	11	16	14				



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switching characteristics over recommended operating free-air temperature range,  $C_L = 150 \text{ pF}$   
(unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			SN54HCT244		SN74HCT244		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	Y	4.5 V	21	45	68	56	ns			
			5.5 V	18	40	61	51				
$t_{en}$	$\overline{OE}$	Y	4.5 V	25	52	79	65	ns			
			5.5 V	22	47	71	59				
$t_t$		Y	4.5 V	17	42	63	53	ns			
			5.5 V	14	38	57	48				

operating characteristics,  $T_A = 25^\circ\text{C}$

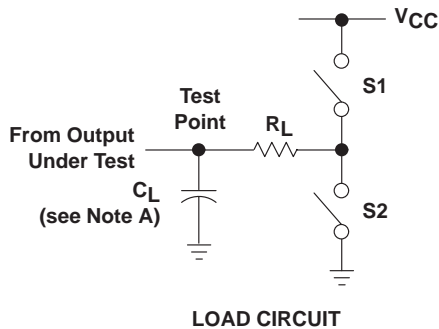
PARAMETER	TEST CONDITIONS	TYP	UNIT
$C_{pd}$ Power dissipation capacitance per buffer/driver	No load	40	pF



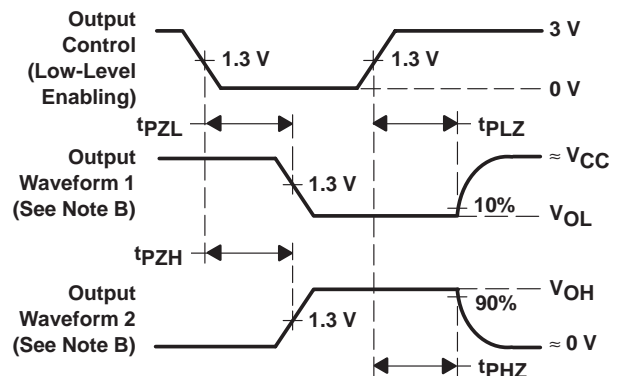
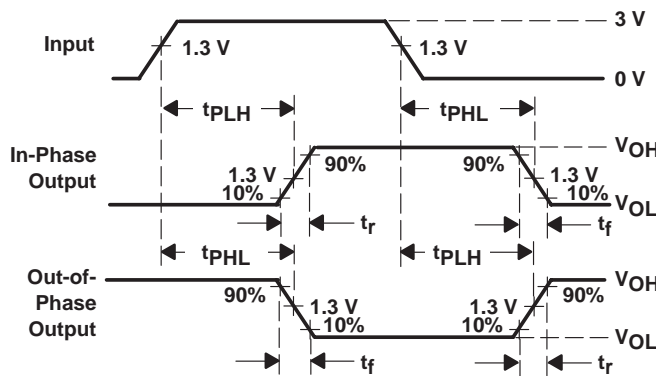
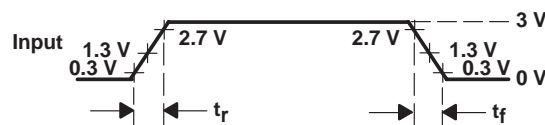
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**PARAMETER MEASUREMENT INFORMATION**



PARAMETER	$R_L$	$C_L$	S1	S2
$t_{en}$	1 k $\Omega$	50 pF or 150 pF	Open	Closed
			Closed	Open
$t_{dis}$	1 k $\Omega$	50 pF	Open	Closed
			Closed	Open
$t_{pd}$ or $t_t$	—	50 pF or 150 pF	Open	Open



- NOTES:
- A.  $C_L$  includes probe and test-fixture 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. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1$  MHz,  $Z_O = 50 \Omega$ ,  $t_r = 6$  ns,  $t_f = 6$  ns.
  - D. The outputs are measured one at a time with one input 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 1. Load Circuit and Voltage Waveforms**

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