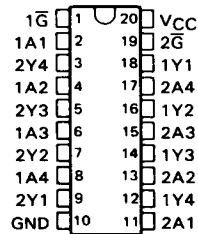


# SN54HC244, SN74HC244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

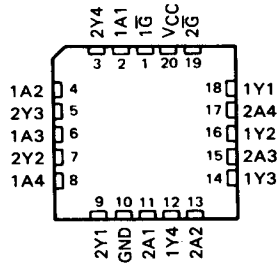
D2684, DECEMBER 1982—REVISED SEPTEMBER 1987

- 3-State Output Drive Bus Lines or Buffer Memory Address Registers
- High-Current Outputs Can Drive Up to 15 LSTTL Loads
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

SN54HC244 . . . J PACKAGE  
SN74HC244 . . . DW OR N PACKAGE  
(TOP VIEW)



SN54HC244 . . . FK PACKAGE  
(TOP VIEW)

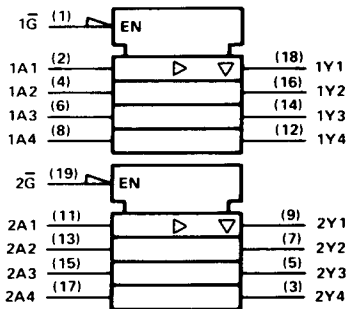


## description

These octal buffers and line drivers are designed specifically to improve both the performance and density of the three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the 'HC240 and 'HC241, these devices provide the choice of selected combinations of inverting outputs, symmetrical  $\bar{G}$  (active-low input control) inputs and complementary  $\bar{G}$  and  $\bar{G}$  inputs.

The SN54HC244 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74HC244 is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .

## logic symbol†



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

2  
HCMOS Devices

PRODUCTION DATA documents contain information 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.



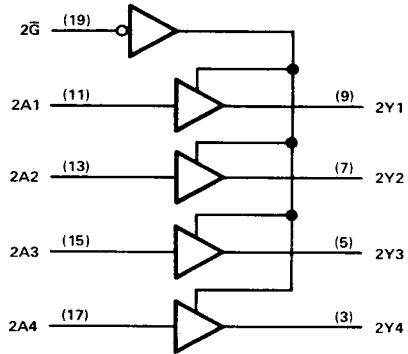
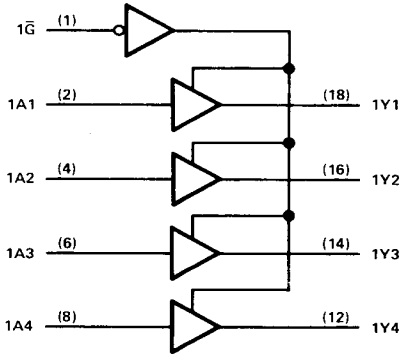
POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

Copyright © 1982, Texas Instruments Incorporated

2-327

**SN54HC244, SN74HC244**  
**OCTAL BUFFERS AND LINE DRIVERS**  
**WITH 3-STATE OUTPUTS**

logic diagram (positive logic)



2

HC MOS Devices

**absolute maximum ratings over operating free-air temperature†**

Supply voltage, $V_{CC}$ .....	-0.5 V to 7 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 $V_O > V_{CC}$ ) .....	$\pm 20$ mA
Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ ) .....	$\pm 35$ mA
Continuous current through $V_{CC}$ or GND pins .....	$\pm 70$ mA
Lead temperature 1,6 mm (1/16 in) from case for 60 s: FK or J package .....	300°C
Lead temperature 1,6 mm (1/16 in) from case for 10 s: DW or N package .....	260°C
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.

**recommended operating conditions**

		SN54HC244			SN74HC244			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	2	5	6	2	5	6	V
$V_{IH}$	High-level input voltage	$V_{CC} = 2$ V	1.5		1.5			V
		$V_{CC} = 4.5$ V	3.15		3.15			
		$V_{CC} = 6$ V	4.2		4.2			
$V_{IL}$	Low-level input voltage	$V_{CC} = 2$ V	0	0.3	0	0.3	V	
		$V_{CC} = 4.5$ V	0	0.9	0	0.9		
		$V_{CC} = 6$ V	0	1.2	0	1.2		
$V_I$	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) times	$V_{CC} = 2$ V	0	1000	0	1000	ns	
		$V_{CC} = 4.5$ V	0	500	0	500		
		$V_{CC} = 6$ V	0	400	0	400		
$T_A$	Operating free-air temperature	-55	125	40	85	°C		

# SN54HC244, SN74HC244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

2

HCMOS Devices

**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			SN54HC244		SN74HC244		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> . I <sub>OH</sub> = -20 μA	2 V	1.9	1.998		1.9		1.9	V	
		4.5 V	4.4	4.499		4.4		4.4		
		6 V	5.9	5.999		5.9		5.9		
	4.5 V	3.98	4.30		3.7		3.84			
V <sub>OL</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> . I <sub>OL</sub> = 20 μA	2 V		0.002	0.1		0.1		V	
		4.5 V		0.001	0.1		0.1			
		6 V		0.001	0.1		0.1			
	4.5 V		0.17	0.26		0.4	0.33			
I <sub>I</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> . I <sub>OL</sub> = 7.8 mA	6 V		0.15	0.26		0.4	0.33	nA	
		6 V		±0.1	±100		±1000	±1000		
I <sub>OZ</sub>	V <sub>O</sub> = V <sub>CC</sub> or 0. V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	6 V		±0.01	±0.5		±10	±5	μA	
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or 0. I <sub>O</sub> = 0	6 V					8	160	80	μA
C <sub>I</sub>		2 to 6 V			3	10		10	10	pF

**switching characteristics over recommended operating free-air temperature range (unless otherwise noted), C<sub>L</sub> = 50 pF (see Note 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54HC244		SN74HC244		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>pd</sub>	A	Y	2 V		40	115		170		145	ns
			4.5 V		13	23		34		29	
			6 V		11	20		29		25	
t <sub>en</sub>	G	Y	2 V		75	150		225		190	ns
			4.5 V		15	30		45		38	
			6 V		13	26		38		32	
t <sub>dis</sub>	G	Y	2 V		75	150		225		190	ns
			4.5 V		15	30		45		38	
			6 V		13	26		38		32	
t <sub>t</sub>		Y	2 V		28	60		90		75	ns
			4.5 V		8	12		18		15	
			6 V		6	10		15		13	

C <sub>pd</sub>	Power dissipation capacitance per gate	No load, T <sub>A</sub> = 25°C	35 pF typ
-----------------	--	--------------------------------	-----------

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

**SN54HC244, SN74HC244**  
**OCTAL BUFFERS AND LINE DRIVERS**  
**WITH 3-STATE OUTPUTS**

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub>	T <sub>A</sub> = 25 °C			SN54HC244		SN74HC244		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>pd</sub>	A	Y	2 V		56	165		245		210	ns
			4.5 V		18	33		49		42	
			6 V		15	28		42		35	
t <sub>en</sub>	$\bar{G}$	Y	2 V		100	200		300		250	ns
			4.5 V		20	40		60		50	
			6 V		17	34		51		43	
t <sub>t</sub>		Y	2 V		45	210		315		265	ns
			4.5 V		17	42		63		53	
			6 V		13	36		53		45	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

2

HC MOS Devices