

# SN54F244, SN74F244 OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

SDFS063A - D2932, MARCH 1987 - REVISED OCTOBER 1993

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Package Options Include Plastic Small-Outline (SOIC) and Shrink Small-Outline (SSOP) Packages, Ceramic Chip Carriers, and Plastic and Ceramic DIPs

## description

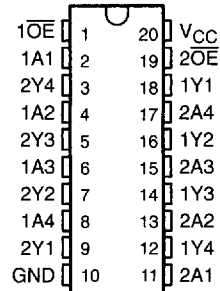
These octal buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the 'F240 and 'F241, these devices provide the choice of selected combinations of inverting and noninverting outputs, symmetrical  $\overline{OE}$  (active-low output-enable) inputs, and complementary OE and  $\overline{OE}$  inputs.

The 'F244 is organized as two 4-bit buffers/line drivers with separate output enable ( $\overline{OE}$ ) inputs. When  $\overline{OE}$  is low, the device passes data from the A inputs to the Y outputs. When  $\overline{OE}$  is high, the outputs are in the high-impedance state.

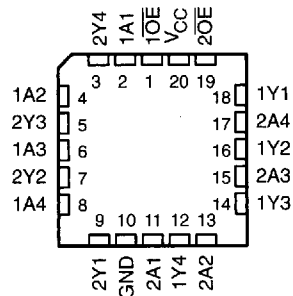
The SN74F244 is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN54F244 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74F244 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN54F244 ... J PACKAGE  
SN74F244 ... DB, DW, OR N PACKAGE  
(TOP VIEW)



SN54F244 ... FK PACKAGE  
(TOP VIEW)



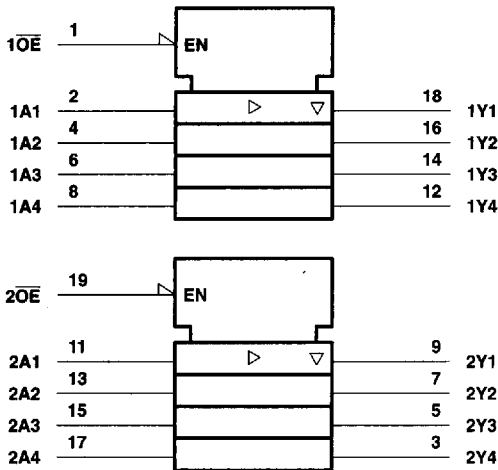
FUNCTION TABLE  
(each buffer)

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

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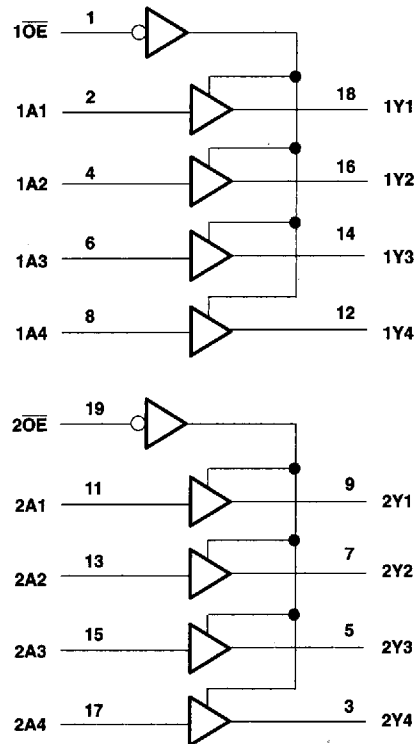
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## logic symbol†



† 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) .....	-1.2 V to 7 V
Input current range .....	-30 mA to 5 mA
Voltage range applied to any output in the disabled or power-off state .....	-0.5 V to 5.5 V
Voltage range applied to any output in the high state .....	-0.5 V to $V_{CC}$
Current into any output in the low state: SN54F244 .....	96 mA
SN74F244 .....	128 mA
Operating free-air temperature range: SN54F244 .....	-55°C to 125°C
SN74F244 .....	0°C to 70°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.

NOTE 1: The input voltage ratings may be exceeded provided the input current ratings are observed.

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## recommended operating conditions

		SN54F244			SN74F244			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5	5.5	4.5	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			V
I <sub>IK</sub>	Input clamp current				-18			mA
I <sub>OH</sub>	High-level output current				-12			mA
I <sub>OL</sub>	Low-level output current				48			mA
T <sub>A</sub>	Operating free-air temperature	-55			125			°C

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

PARAMETER	TEST CONDITIONS	SN54F244			SN74F244			UNIT	
		MIN	TYP†	MAX	MIN	TYP†	MAX		
V <sub>IK</sub>	V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = -18 mA				-1.2			V	
V <sub>OH</sub>	V <sub>CC</sub> = 4.5 V	I <sub>OH</sub> = -3 mA		2.4	3.3	2.4	3.3	V	
		I <sub>OH</sub> = -12 mA		2	3.2				
		I <sub>OH</sub> = -15 mA				2	3.1		
	V <sub>CC</sub> = 4.75 V, I <sub>OH</sub> = -3 mA				2.7				
V <sub>OL</sub>	V <sub>CC</sub> = 4.5 V	I <sub>OL</sub> = 48 mA		0.38	0.55			V	
		I <sub>OL</sub> = 64 mA				0.42	0.55		
I <sub>OZH</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.7 V				50			μA	
I <sub>OZL</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 0.5 V				-50			μA	
I <sub>I</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 7 V				0.1			mA	
I <sub>IH</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V				20			μA	
I <sub>IL</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.5 V	OE		-1			-1		mA
		Any A		-1.6			-1.6		
I <sub>OS</sub> ‡	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 0	-100			-225			mA	
I <sub>CC</sub>	V <sub>CC</sub> = 5.5 V, Outputs open	Outputs high		40	60	40	60	mA	
		Outputs low		60	90	60	90		
		Outputs disabled		60	90	60	90		

† All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

‡ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

**SN54F244, SN74F244**  
**OCTAL BUFFERS/DRIVERS**  
**WITH 3-STATE OUTPUTS**

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**switching characteristics (see Note 2)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5\text{ V},$ $C_L = 50\text{ pF},$ $R_L = 500\ \Omega,$ $T_A = 25^\circ\text{C}$			$V_{CC} = 4.5\text{ V to }5.5\text{ V},$ $C_L = 50\text{ pF},$ $R_L = 500\ \Omega,$ $T_A = \text{MIN to MAX}^\dagger$				UNIT
			'F244			SN54F244		SN74F244		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_{PLH}$	A	Y	1.7	3.6	5.2	2	6.5	1.7	6.2	ns
$t_{PHL}$			1.7	3.6	5.2	2	7	1.7	6.5	
$t_{PZH}$	$\overline{OE}$	Y	1.2	3.9	5.7	2	7	1.2	6.7	ns
$t_{PZL}$			1.2	5	7	2	8.5	1.2	8	
$t_{PHZ}$	$\overline{OE}$	Y	1.2	4.1	6	2	7	1.2	7	ns
$t_{PLZ}$			1.2	4.1	6	2	7.5	1.2	7	

$^\dagger$  For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

NOTE 2: Load circuits and waveforms are shown in Section 1.