

# SN54ALS244B, SN54AS244, SN74ALS244B, SN74AS244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

SDAS142 – D2661, DECEMBER 1982 – REVISED JULY 1987

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- PNP inputs Reduce DC Loading
- Package Options include Plastic Small Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

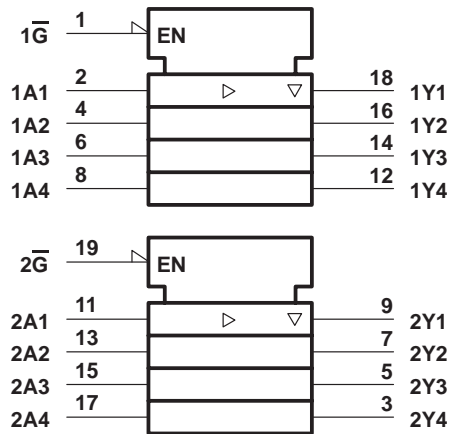
## description

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 'ALS240A, 'ALS241A, 'AS240, and 'AS241, these devices provide the choice of selected combinations of inverting outputs, symmetrical  $\overline{G}$  (active-low input control) inputs, and complementary  $\overline{G}$  and  $\overline{G}$  inputs.

The -1 version of the SN74ALS244B is identical to the standard version except that the recommended maximum  $I_{OL}$  is increased to 48 mA. There is no -1 version of the SN54ALS244B.

The SN54ALS244B and SN54AS244 are characterized for operation over the full military temperature range of -55°C to 125°C. The SN74ALS244B and SN74AS244 are characterized for operation from 0°C to 70°C.

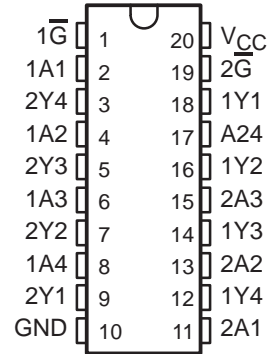
## logic symbol†



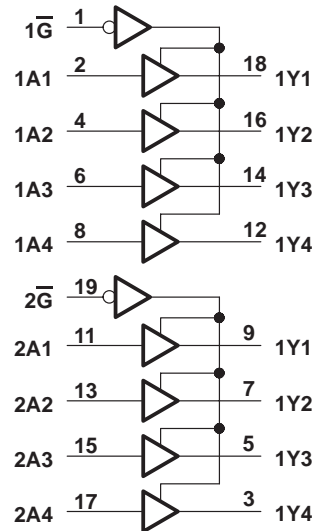
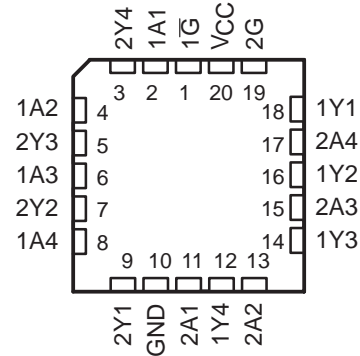
† This is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers are for DW, J, and N packages.

SN54ALS244B, SN54AS244 . . . J PACKAGE  
SN74ALS244B, SN74AS244 . . . DW OR N PACKAGE  
(TOP VIEW)



SN54ALS244B, SN54AS244 . . . FK PACKAGE  
(TOP VIEW)



# SN54ALS244B, SN74ALS244B OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

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## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, $V_{CC}$	7 V
Input voltage	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range: SN54ALS244B	–55°C to 125°C
SN74ALS244B	0°C to 70°C
Storage temperature range	–65°C to 150°C

## recommended operating conditions

	SN54ALS244B			SN74ALS244B			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	2			2			V
$V_{IL}$ Low-level input voltage						0.8	V
			0.8†				
			0.7‡				
$I_{OH}$ High-level output current			–12			–15	mA
$I_{OL}$ Low-level output current				12		24	mA
						48§	
$T_A$ Operating free-air temperature	–55		125	0		70	°C

† Tested at –55°C to 70°C.

‡ Tested at 70°C to 125°C, per MIL-STD-883, method 5005, sub-group 1, 2, and 3. Static tests are performed at 25°C, 125°C, and 55°C.

§ The extended limits apply only if  $V_{CC}$  is maintained between 4.75 V and 5.25 V. The 48-mA limit applies for the SN74ALS244B-1 only.

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

PARAMETER	TEST CONDITIONS	SN54ALS244B			SN74ALS244B			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5$ V, $I_I = -18$ mA			–1.5			–1.5	V
$V_{OH}$	$V_{CC} = 4.5$ V to 5.5 V, $I_{OH} = -0.4$ mA	$V_{CC}-2$			$V_{CC}-2$			V
	$V_{CC} = 4.5$ V to 5.5 V, $I_{OH} = -3$ mA	2.4	3.2		2.4	3.2		
	$V_{CC} = 4.5$ V, $I_{OH} = -12$ mA	2						
	$V_{CC} = 4.5$ V, $I_{OH} = -15$ mA				2			
$V_{OL}$	$V_{CC} = 4.5$ V, $I_{OL} = 12$ mA		0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.75$ V, $I_{OL} = 24$ mA ( $I_{OL} = 48$ mA for –1 version)							
$I_{OZH}$	$V_{CC} = 5.5$ V, $V_O = 2.7$ V			20			20	μA
$I_{OZL}$	$V_{CC} = 5.5$ V, $V_O = 0.4$ V			–20			–20	μA
$I_I$	$V_{CC} = 5.5$ V, $V_I = 7$ V			0.1			0.1	mA
$I_{IH}$	$V_{CC} = 5.5$ V, $V_I = 2.7$ V			20			20	μA
$I_{IL}$	$V_{CC} = 5.5$ V, $V_I = 0.4$ V			–0.1			–0.1	mA
$I_{O}^{\#}$	$V_{CC} = 5.5$ V, $V_O = 2.25$ V	–30		–112	–30		–112	mA
$I_{CC}$	$V_{CC} = 5.5$ V	Outputs high	9	15	9	15	mA	
		Outputs low	15	24	15	24		
		Outputs disabled	17	27	17	27		

† All typical values are at  $V_{CC} = 5$  V,  $T_A = 25$ °C.

# The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .



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# SN54ALS244B, 2N74ALS244B OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

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## switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $C_L = 50 \text{ pF},$ $R_1 = 500 \Omega,$ $R_2 = 500 \Omega,$ $T_A = \text{MIN to MAX}^\dagger$				UNIT
			SN54AS244		SN74AS244		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	Y	1	16	3	10	ns
t <sub>PHL</sub>			3	12	3	10	
t <sub>PZH</sub>	$\bar{G}$	Y	1	26	3	20	ns
t <sub>PZL</sub>			1	24	3	20	
t <sub>PHZ</sub>	$\bar{G}$	Y	2	10	3	10	ns
t <sub>PLZ</sub>			1	26	3	13	

<sup>†</sup> For conditions shown MIN or MAX, use the appropriate value specified under recommended operating conditions.

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of the *ALS/AS Logic Data Book, 1986*.

# SN54AS244, SN74AS244

## OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

SDAS142 – D2661, DECEMBER 1982 – REVISED JULY 1987

### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, $V_{CC}$	7 V
Input voltage	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range: SN54AS244	-55°C to 125°C
SN74AS244	0°C to 70°C
Storage temperature range	-65°C to 150°C

### recommended operating conditions

	SN54AS244			SN74AS244			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	2			2			V
$V_{IL}$ Low-level input voltage			0.8			0.8	V
$I_{OH}$ High-level output current			-12			-15	mA
$I_{OL}$ Low-level output current			48			64	mA
$T_A$ Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS	SN54AS244			SN74AS244			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5\text{ V}$ , $I_I = -18\text{ mA}$			-1.2			-1.2	V
$V_{OH}$	$V_{CC} = 4.5\text{ V to } 5.5\text{ V}$ , $I_{OH} = -2\text{ mA}$	$V_{CC}-2$		$V_{CC}-2$				V
	$V_{CC} = 4.5\text{ V}$ , $I_{OH} = -3\text{ mA}$	2.4	3.4	2.4	3.4			
	$V_{CC} = 4.5\text{ V}$ , $I_{OH} = -12\text{ mA}$	2.4						
	$V_{CC} = 4.5\text{ V}$ , $I_{OH} = -15\text{ mA}$				2.4			
$V_{OL}$	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 48\text{ mA}$			0.55				V
	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 64\text{ mA}$					0.55		
$I_{OZH}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 2.7\text{ V}$			50			50	μA
$I_{OZL}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 0.4\text{ V}$			-50			-50	μA
$I_I$	$V_{CC} = 5.5\text{ V}$ , $V_I = 7\text{ V}$			0.1			0.1	mA
$I_{IH}$	$V_{CC} = 5.5\text{ V}$ , $V_I = 2.7\text{ V}$			20			20	μA
$I_{IL}$	$V_{CC} = 5.5\text{ V}$ , $V_I = 0.4\text{ V}$	$\bar{G}$		-0.5			-0.5	mA
		A		-1			-1	
$I_{O\ddagger}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 2.25\text{ V}$	-50		-150	50		-150	mA
$I_{CC}$	$V_{CC} = 5.5\text{ V}$	Outputs high	22	34	22	34		mA
		Outputs low	60	90	60	90		
		Outputs disabled	34	54	34	54		

† All typical values are at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .

# SN54AS244, SN74AS244

## OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

SDAS142 – D2661, DECEMBER 1982 – REVISED JULY 1987

### switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$ , $C_L = 50 \text{ pF}$ , $R_1 = 500 \Omega$ , $R_2 = 500 \Omega$ , $T_A = \text{MIN to MAX}^\dagger$				UNIT
			SN54AS244		SN74AS244		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	A	Y	2	9	2	6.2	ns
$t_{PHL}$			2	7	2	6.2	
$t_{PZH}$	$\bar{G}$	Y	2	10	2	9	ns
$t_{PZL}$			2	8	2	7.5	
$t_{PHZ}$	$\bar{G}$	Y	2	6.5	2	6	ns
$t_{PLZ}$			2	10.5	2	9	

<sup>†</sup> For conditions shown MIN or MAX, use the appropriate value specified under recommended operating conditions.

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of the *ALS/AS Logic Data Book, 1986*.

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