

# SN74ALS746 OCTAL BUFFER AND LINE DRIVER WITH INPUT PULLUP RESISTORS

SDAS052A – AUGUST 1984 – REVISED JANUARY 1995

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Input Pullup Resistors Added for Data-Bus Termination
- Data Flow-Through Pinout (All Inputs on Opposite Side From Outputs)
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (N) 300-mil DIPs

## description

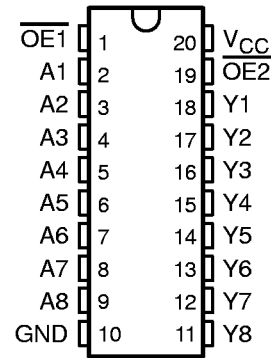
This octal buffer and line driver is designed to have the performance of the ALS240A and, at the same time, offers a pinout with inputs and outputs on opposite sides of the package. This arrangement facilitates printed-circuit-board layout. In addition, 20-k $\Omega$  resistors have been added between all inputs and V<sub>CC</sub>. This eliminates adding external resistors in applications where the data bus must be at a high level when all other connecting devices are at a high-impedance state.

The 3-state control gate is a 2-input NOR such that if either output-enable ( $\overline{OE1}$  or  $\overline{OE2}$ ) input is high, all eight outputs are in the high-impedance state.

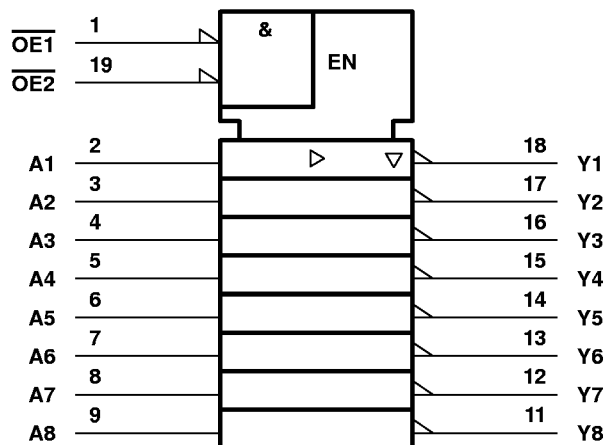
The SN74ALS746 provides inverted data at the outputs.

The SN74ALS746 is characterized for operation from 0°C to 70°C.

DW OR N PACKAGE  
(TOP VIEW)

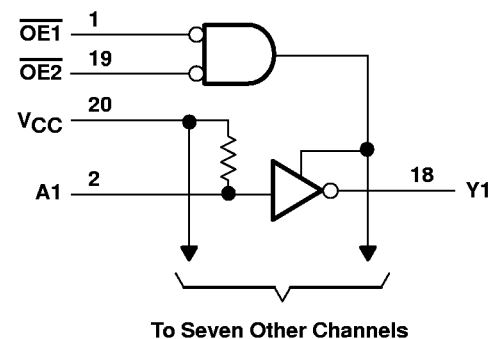


## logic symbol†



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

## logic diagram (positive logic)



All input pullup resistors are 20 k $\Omega$ .

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

Supply voltage, $V_{CC}$	7 V
Input voltage, $V_I$	7 V
Operating free-air temperature range, $T_A$	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.

### recommended operating conditions

	MIN	NOM	MAX	UNIT
$V_{CC}$ Supply voltage	4.5	5	5.5	V
$V_{IH}$ High-level input voltage	2			V
$V_{IL}$ Low-level input voltage			0.8	V
$I_{OH}$ High-level output current			-15	mA
$I_{OL}$ Low-level output current			24	mA
$T_A$ Operating free-air temperature	0		70	°C

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

PARAMETER	TEST CONDITIONS	MIN	TYP‡	MAX	UNIT
$V_{IK}$	$V_{CC} = 4.5\text{ V}$ , $I_I = -18\text{ mA}$			-1.2	V
$V_{OH}$	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $I_{OH} = -0.4\text{ mA}$	$V_{CC} - 2$			V
	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -3\text{ mA}$	2.4	3.2	
		$I_{OH} = -15\text{ mA}$	2		
$V_{OL}$	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 12\text{ mA}$	0.25	0.4	V
		$I_{OL} = 24\text{ mA}$	0.35	0.5	
$I_{OZH}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 2.7\text{ V}$			20	$\mu\text{A}$
$I_{OZL}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 0.4\text{ V}$			-20	$\mu\text{A}$
$I_I$	$V_{CC} = 5.5\text{ V}$	$V_I = 5.5\text{ V}$		0.1	mA
		$V_I = 7\text{ V}$		0.1	
$I_{IH}$	$V_{CC} = 5.5\text{ V}$ , $V_I = 2.7\text{ V}$			-0.2	mA
				20	
$I_{IL}$	$V_{CC} = 5.5\text{ V}$ , $V_I = 0.4\text{ V}$			-0.6	mA
				-0.1	
$I_{OS}§$	$V_{CC} = 5.5\text{ V}$ , $V_O = 2.25\text{ V}$	-30		-112	mA
$I_{CC}$	$V_{CC} = 5.5\text{ V}$	Outputs high	7	12	mA
		Outputs low	13	22	
		Outputs disabled	11	19	

‡ 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,  $I_{OS}$ .



**switching characteristics (see Figure 1)**

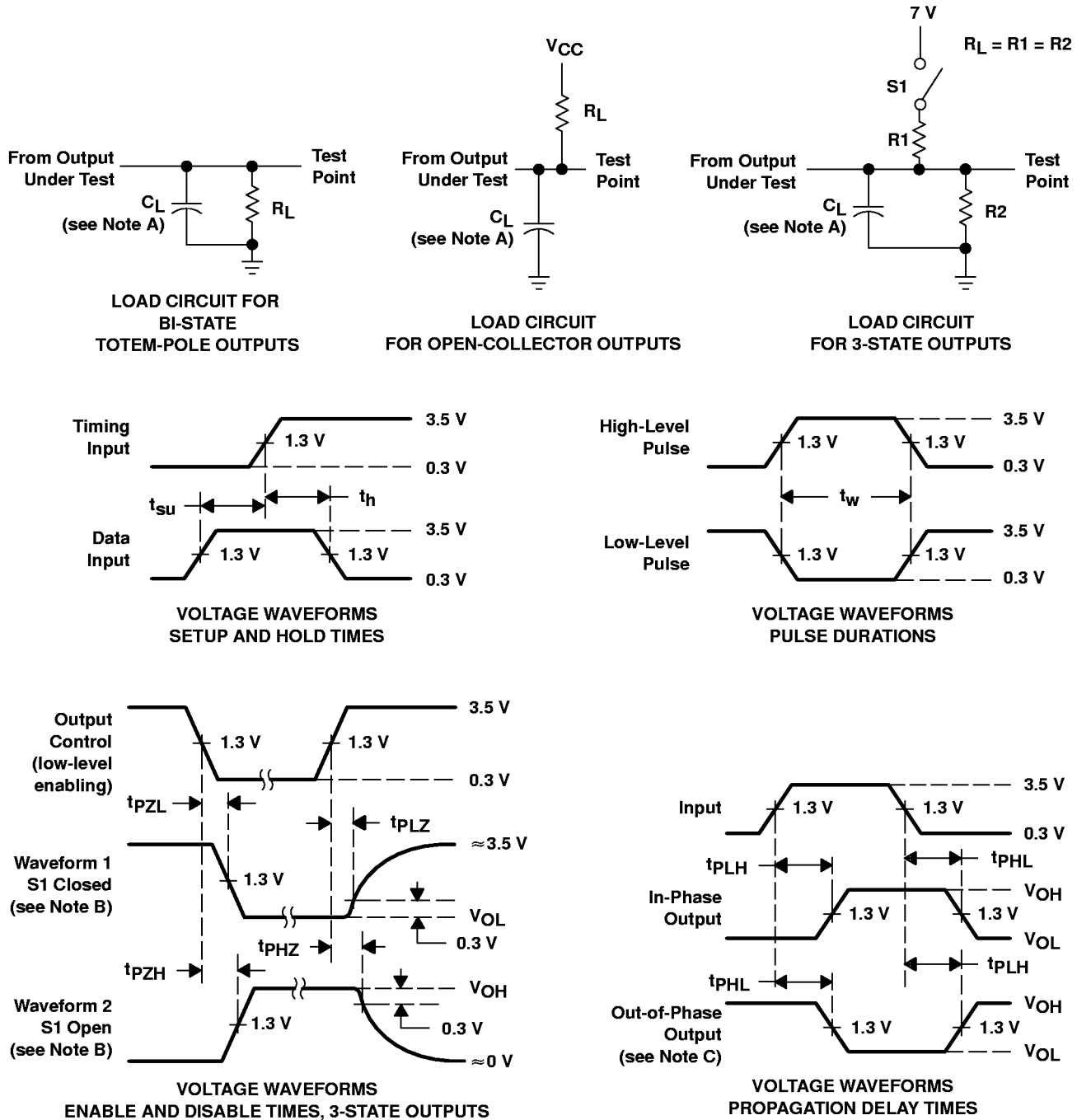
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX†		UNIT
			MIN	MAX	
t <sub>PLH</sub>	A	Y	3	12	ns
t <sub>PHL</sub>			2	9	
t <sub>PZH</sub>	$\overline{\text{OE}}$	Y	5	15	ns
t <sub>PZL</sub>			8	20	
t <sub>PHZ</sub>	$\overline{\text{OE}}$	Y	1	10	ns
t <sub>PLZ</sub>			2	12	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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**WITH INPUT PULLUP RESISTORS**

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**PARAMETER MEASUREMENT INFORMATION**  
**SERIES 54ALS/74ALS AND 54AS/74AS DEVICES**



- 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. When measuring propagation delay items of 3-state outputs, switch S1 is open.  
 D. All input pulses have the following characteristics:  $PRR \leq 1$  MHz,  $t_r = t_f = 2$  ns, duty cycle = 50%.  
 E. The outputs are measured one at a time with one transition per measurement.

**Figure 1. Load Circuits and Voltage Waveforms**