

# SN74ALS1240

## OCTAL BUFFER AND LINE DRIVER WITH 3-STATE OUTPUTS

SDAS054B – DECEMBER 1982 – REVISED JANUARY 1995

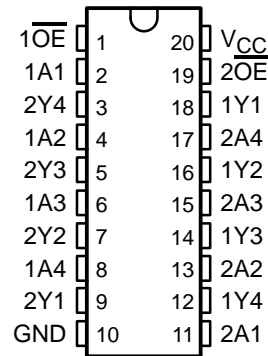
- Low-Power Version of SN74ALS240A
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- pnp Inputs Reduce dc Loading
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (N) 300-mil DIPs

### description

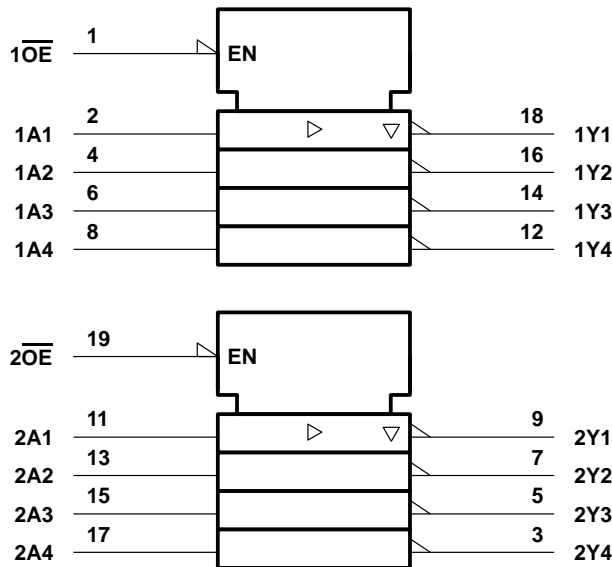
This octal buffer and line driver is designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The designer has a choice of selected combinations of inverting and noninverting outputs, symmetrical active-low output-enable ( $\overline{OE}$ ) inputs, and complementary OE and  $\overline{OE}$  inputs. This device features high fan-out and improved fan-in.

The SN74ALS1240 is characterized for operation from 0°C to 70°C.

DW OR N PACKAGE  
(TOP VIEW)

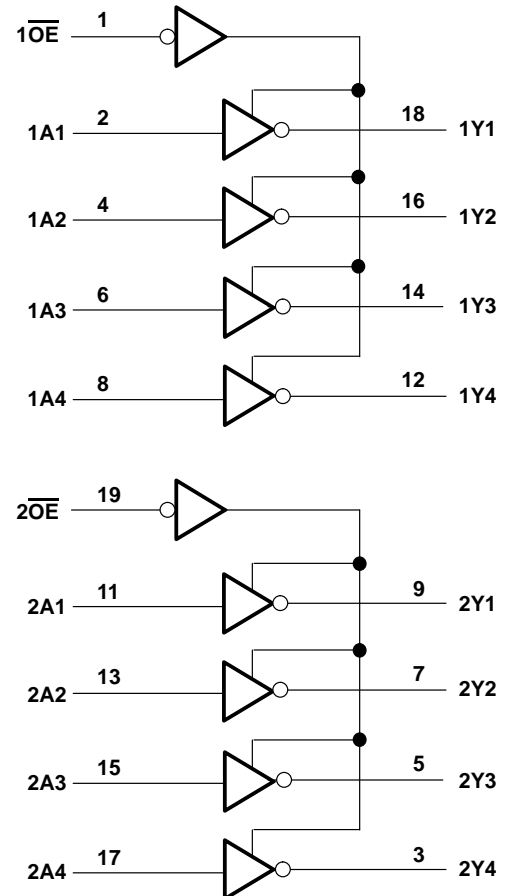


### logic symbol†



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

### logic diagram (positive logic)



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

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

<sup>†</sup> 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			16	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 <sup>‡</sup>	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		
$V_{OL}$	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 8\text{ mA}$	0.25	0.4	V
		$I_{OL} = 16\text{ mA}$	0.35	0.5	
$I_{OZH}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 2.7\text{ V}$			20	μA
$I_{OZL}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 0.4\text{ V}$			–20	μA
$I_I$	$V_{CC} = 5.5\text{ V}$ , $V_I = 7\text{ V}$			0.1	mA
$I_{IH}$ <sup>§</sup>	$V_{CC} = 5.5\text{ V}$ , $V_I = 2.7\text{ V}$			20	μA
$I_{IL}$ <sup>§</sup>	$V_{CC} = 5.5\text{ V}$ , $V_I = 0.4\text{ V}$			–0.1	mA
$I_O$ <sup>¶</sup>	$V_{CC} = 5.5\text{ V}$ , $V_O = 2.25\text{ V}$	–30		–112	mA
$I_{CC}$	$V_{CC} = 5.5\text{ V}$	Outputs high	5	8	mA
		Outputs low	8.5	14	
		Outputs disabled	8.1	13	

<sup>‡</sup> All typical values are at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

<sup>§</sup> For I/O ports, the parameters  $I_{IH}$  and  $I_{IL}$  include the off-state output current.

<sup>¶</sup> 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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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, R1 = 500 Ω, R2 = 500 Ω, T <sub>A</sub> = MIN to MAX†		UNIT
			MIN	MAX	
t <sub>PLH</sub>	A	Y	2	13	ns
t <sub>PHL</sub>			2	13	
t <sub>PZH</sub>	$\overline{\text{OE}}$	Y	4	20	ns
t <sub>PZL</sub>			6	22	
t <sub>PHZ</sub>	$\overline{\text{OE}}$	Y	2	10	ns
t <sub>PLZ</sub>			3	13	

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

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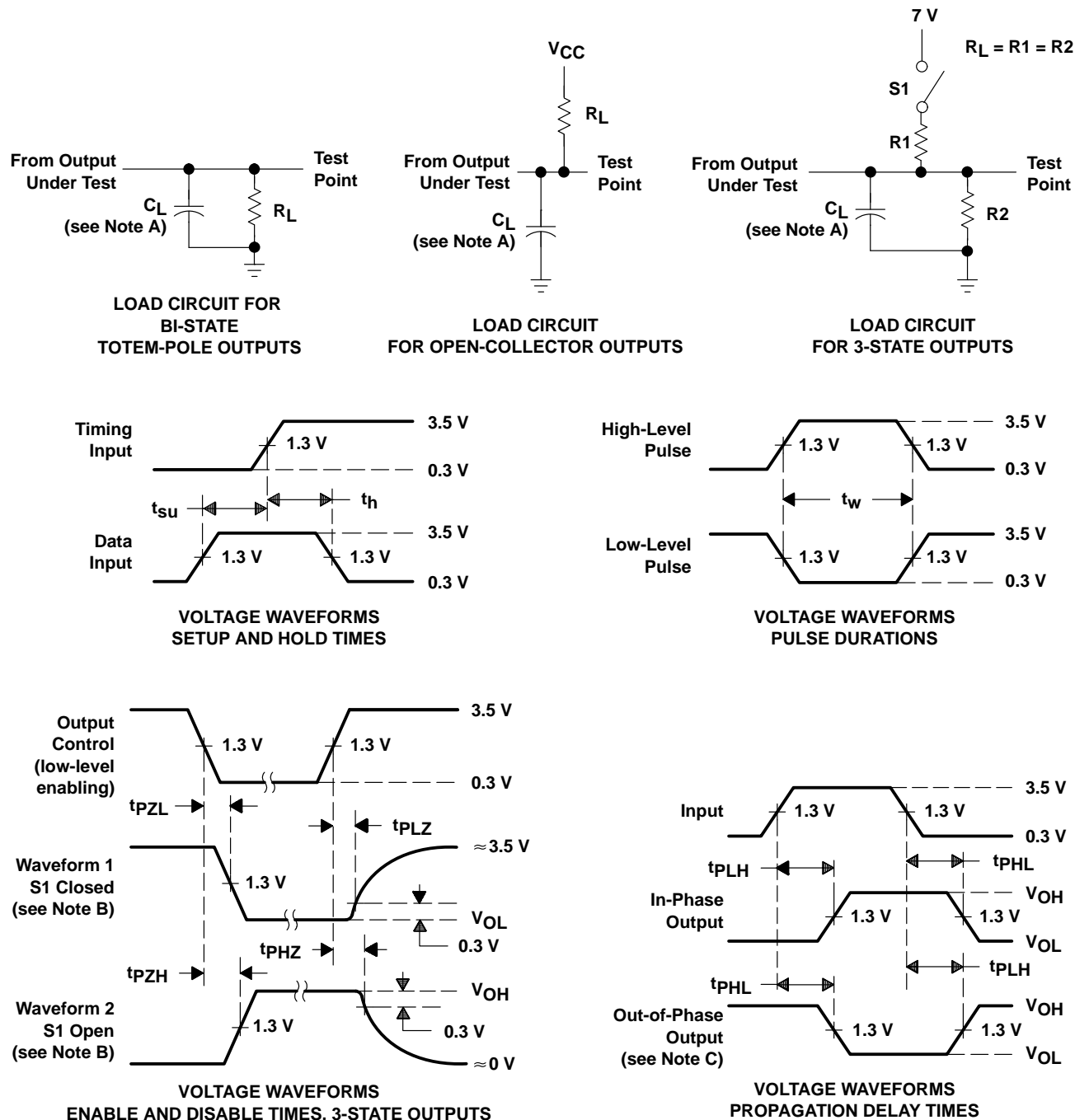
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#### PARAMETER MEASUREMENT INFORMATION

#### SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



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

Figure 1. Load Circuits and Voltage Waveforms

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