- **3-State Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **pnp Inputs Reduce dc Loading**
- **Outputs Have 25-Ω Series Resistor So No External Resistors Are Required**
- **Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (N) 300-mil DIPs**

DW OR N PACKAGE
(TOP VIEW)

$\overline{OE1}$	1	20	V_{CC}
A1	2	19	$\overline{OE2}$
A2	3	18	Y1
A3	4	17	Y2
A4	5	16	Y3
A5	6	15	Y4
A6	7	14	Y5
A7	8	13	Y6
A8	9	12	Y7
GND	10	11	Y8
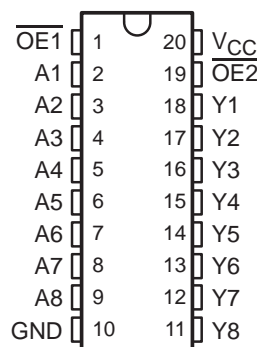
description

This octal line driver/MOS driver is designed to drive the capacitive input characteristics of MOS devices and to have the performance of the popular SN74ALS240 series. At the same time, this device offers a pinout with inputs and outputs on opposite sides of the package. This arrangement greatly facilitates printed-circuit-board layout.

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

The SN74ALS2541 provides true data at the outputs.

The SN74ALS2541 is characterized for operation from 0°C to 70°C.

logic symbol†

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

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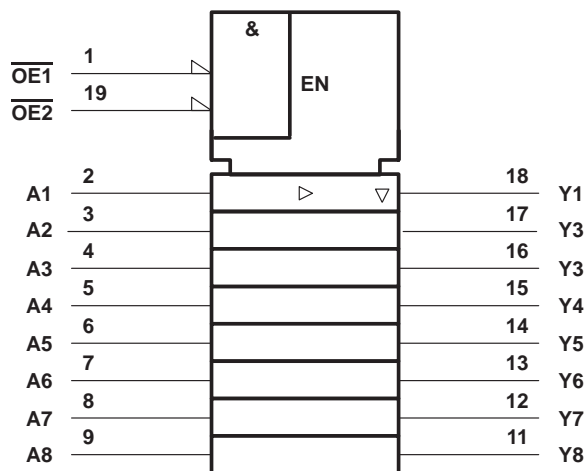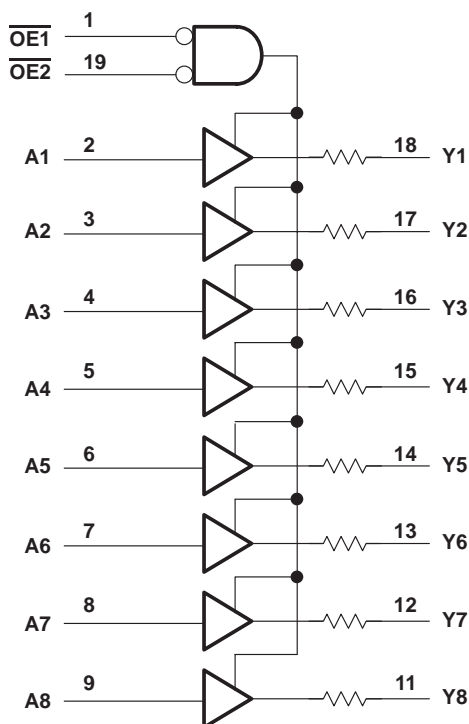# SN74ALS2541
OCTAL LINE DRIVER/MOS DRIVER
WITH 3-STATE OUTPUTS
SDAS273 – DECEMBER 1994

logic diagram (positive logic)

All output resistors are 25 Ω.

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

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

† 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			−0.4	mA
I_{OL}	Low-level output current			12	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 V,	I_I = −18 mA			−1.2	V
V_{OH}	V_{CC} = 4.5 V to 5.5 V,	I_{OH} = −0.4 mA	V_{CC}−2			V
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 1 mA		0.15	0.5	V
		I_{OL} = 12 mA		0.35	0.8	
I_{OZH}	V_{CC} = 5.5 V,	V_O = 2.7 V			20	µA
I_{OZL}	V_{CC} = 5.5 V,	V_O = 0.4 V			−20	µA
I_{OH}	V_{CC} = 4.5 V,	V_O = 2 V	−15			mA
IOL	V_{CC} = 4.5 V,	V_O = 2 V	30			mA
I_I	V_{CC} = 5.5 V,	V_I = 7 V			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			20	µA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.4 V			−0.1	mA
I_O‡	V_{CC} = 5.5 V,	V_O = 2.25 V	−15		−70	mA
I_{CC}	V_{CC} = 5.5 V	Outputs high		6	14	mA
		Outputs low		15	25	
		Outputs disabled		13.5	22	

† All typical values are 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}.

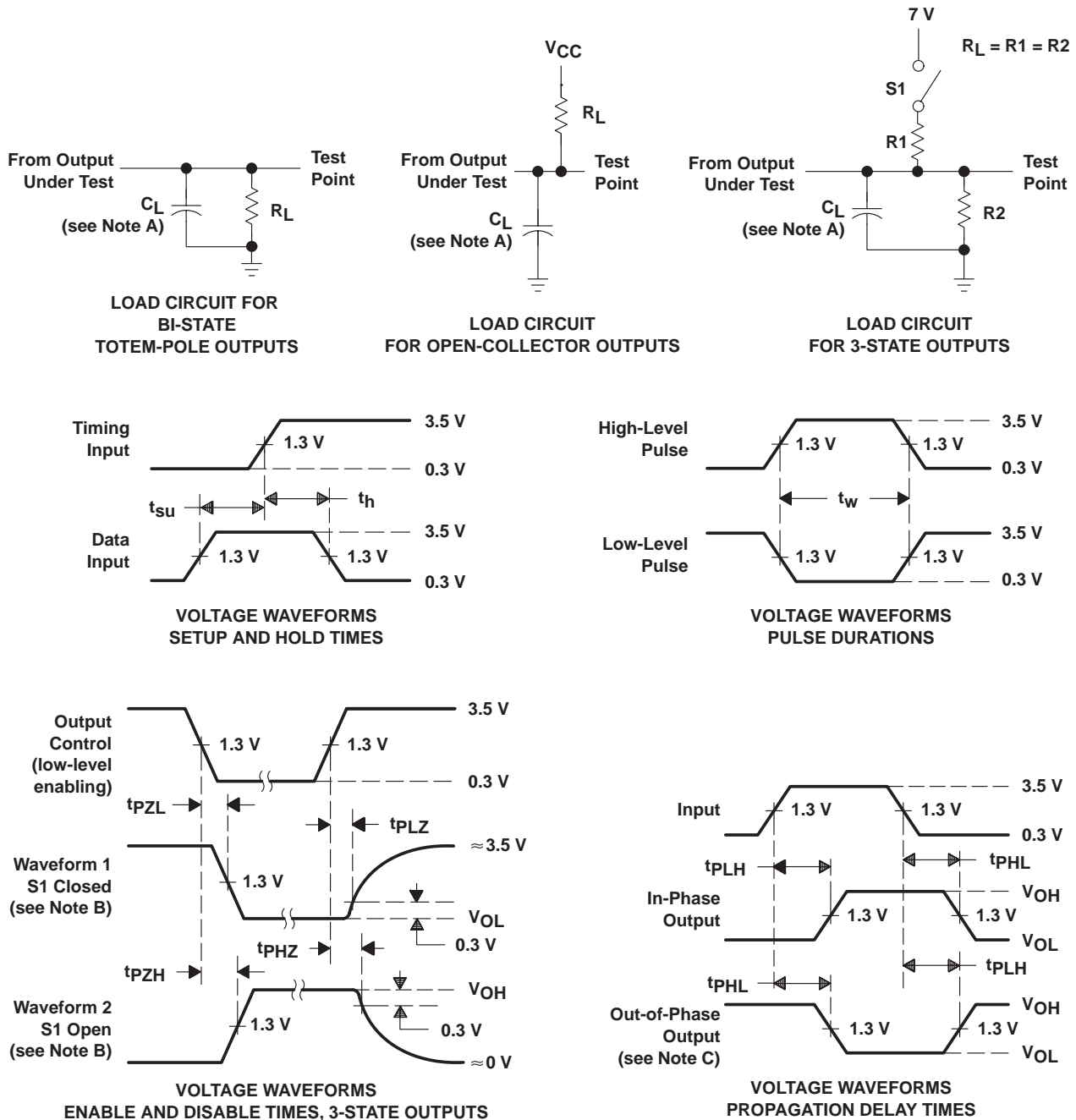## switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX§		UNIT
			MIN	MAX	
t_{PLH}	A	Y	2	15	ns
t_{PHL}			2	12	
t_{PZH}	$\overline{OE}$	Y	5	15	ns
t_{PZL}			8	20	
t_{PHZ}	$\overline{OE}$	Y	1	10	ns
t_{PLZ}			2	12	

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

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

**LOAD CIRCUIT FOR
BI-STATE
TOTEM-POLE OUTPUTS**

**LOAD CIRCUIT
FOR OPEN-COLLECTOR OUTPUTS**

**LOAD CIRCUIT
FOR 3-STATE OUTPUTS**

**VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES**

**VOLTAGE WAVEFORMS
PULSE DURATIONS**

**VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, 3-STATE OUTPUTS**

**VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES**

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 ≤ 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

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