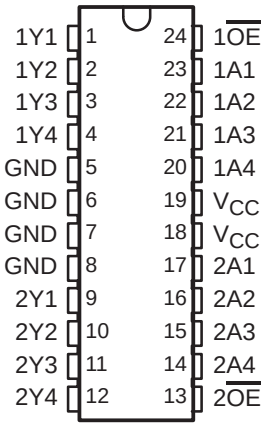
# 74ACT11240
# OCTAL BUFFER/LINE DRIVER WITH 3-STATE OUTPUTS

SCAS210A – MAY 1987 – REVISED APRIL 1996

- **Inputs Are TTL-Voltage Compatible**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin $V_{CC}$ and GND Configurations Minimize High-Speed Switching Noise**
- ***EPIC*™ (Enhanced-Performance Implanted CMOS) 1-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline (DW) and Shrink Small-Outline (DB) Packages, and Standard Plastic 300-mil DIPs (NT)**

**DB, DW, OR NT PACKAGE**
**(TOP VIEW)**




## description

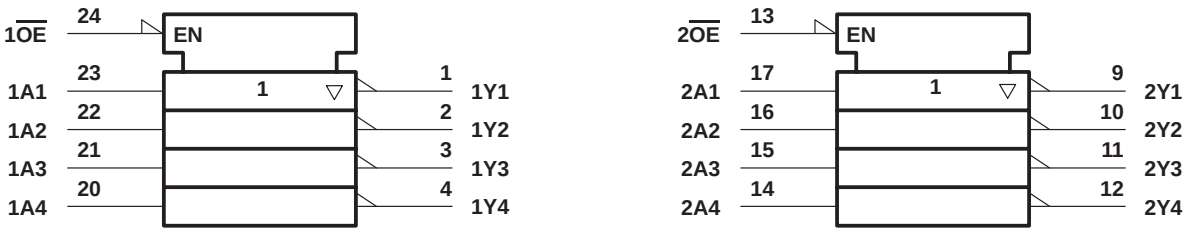
This octal buffer or line driver is designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. This device provides inverting outputs and symmetrical active-low output-enable ($\overline{OE}$) inputs.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

The 74ACT11240 is characterized for operation from –40°C to 85°C.

**FUNCTION TABLE**
**(each buffer)**

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

## logic symbol†




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

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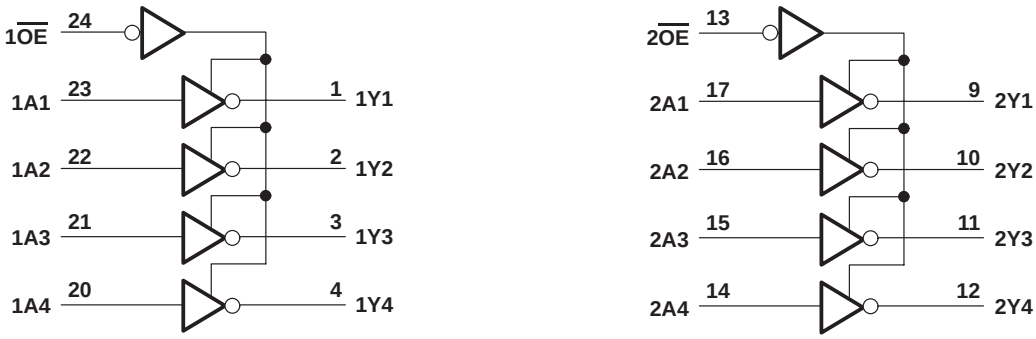
## logic diagram (positive logic)




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

Supply voltage range, $V_{CC}$ . . . . . –0.5 V to 6 V
Input voltage range, $V_I$ (see Note 1) . . . . . –0.5 V to $V_{CC}$ + 0.5 V
Output voltage range, $V_O$ (see Note 1) . . . . . –0.5 V to $V_{CC}$ + 0.5 V
Input clamp current, $I_{IK}$ ($V_I$ < 0 or $V_I$ > $V_{CC}$) . . . . . ±20 mA
Output clamp current, $I_{OK}$ ($V_O$ < 0 or $V_O$ > $V_{CC}$) . . . . . ±50 mA
Continuous output current, $I_O$ ($V_O$ = 0 to $V_{CC}$) . . . . . ±50 mA
Continuous current through $V_{CC}$ or GND . . . . . ±200 mA
Maximum power dissipation at $T_A$ = 55°C (in still air) (see Note 2): DB package . . . . . 0.65 W
DW package . . . . . 1.7 W
NT package . . . . . 1.3 W
Storage temperature range, $T_{stg}$ . . . . . –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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the NT package, which has a trace length of zero.

## 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 |
| $V_I$ | Input voltage | 0 | | $V_{CC}$ | V |
| $V_O$ | Output voltage | 0 | | $V_{CC}$ | V |
| $I_{OH}$ | High-level output current | | | –24 | mA |
| $I_{OL}$ | Low-level output current | | | 24 | mA |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | 0 | | 10 | ns/V |
| $T_A$ | Operating free-air temperature | –40 | | 85 | °C |

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

| PARAMETER | TEST CONDITIONS | $V_{CC}$ | $T_A$ = 25°C | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | |
| $V_{OH}$ | $I_{OH}$ = –50 μA | 4.5 V | 4.4 | | | 4.4 | | V |
| | | 5.5 V | 5.4 | | | 5.4 | | |
| | $I_{OH}$ = –24 mA | 4.5 V | 3.94 | | | 3.8 | | |
| | | 5.5 V | 4.94 | | | 4.8 | | |
| | $I_{OH}$ = –75 mA† | 5.5 V | | | | 3.85 | | |
| $V_{OL}$ | $I_{OL}$ = 50 μA | 4.5 V | | | 0.1 | | 0.1 | V |
| | | 5.5 V | | | 0.1 | | 0.1 | |
| | $I_{OL}$ = 24 mA | 4.5 V | | | 0.36 | | 0.44 | |
| | | 5.5 V | | | 0.36 | | 0.44 | |
| | $I_{OL}$ = 75 mA† | 5.5 V | | | | | 1.65 | |
| $I_{OZ}$ | $V_O = V_{CC}$ or GND | 5.5 V | | | ±0.5 | | ±5 | μA |
| $I_I$ | $V_I = V_{CC}$ or GND | 5.5 V | | | ±0.1 | | ±1 | μA |
| $I_{CC}$ | $V_I = V_{CC}$ or GND, $I_O$ = 0 | 5.5 V | | | 8 | | 80 | μA |
| $\Delta I_{CC}$‡ | One input at 3.4 V, Other inputs at GND or $V_{CC}$ | 5.5 V | | | 0.9 | | 1 | mA |
| $C_i$ | $V_I = V_{CC}$ or GND | 5 V | | 4 | | | | pF |
| $C_o$ | $V_I = V_{CC}$ or GND | 5 V | | 10 | | | | pF |

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.
‡ This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or $V_{CC}$.

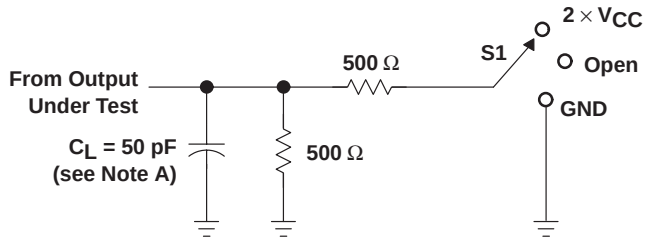
## switching characteristics over recommended operating free-air temperature range, $V_{CC}$ = 5 V ± 0.5 V (unless otherwise noted)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $T_A$ = 25°C | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | | | |
| $t_{PLH}$ | A | Y | 1.5 | 6.5 | 9.9 | 1.5 | 10.6 | ns |
| $t_{PHL}$ | | | 1.5 | 6 | 8 | 1.5 | 8.7 | |
| $t_{PZH}$ | $\overline{OE}$ | Y | 1.5 | 7.5 | 11.7 | 1.5 | 12.5 | ns |
| $t_{PZL}$ | | | 1.5 | 7.3 | 11.5 | 1.5 | 12.3 | |
| $t_{PHZ}$ | $\overline{OE}$ | Y | 1.5 | 7.3 | 9.4 | 1.5 | 10 | ns |
| $t_{PLZ}$ | | | 1.5 | 7.9 | 10.3 | 1.5 | 10.8 | |

## operating characteristics, $V_{CC}$ = 5 V, $T_A$ = 25°C

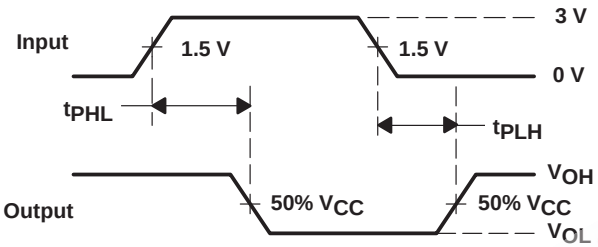
| PARAMETER | | | TEST CONDITIONS | | TYP | UNIT |
|---|---|---|---|---|---|---|
| $C_{pd}$ | Power dissipation capacitance per buffer | Outputs enabled | $C_L$ = 50 pF, | f = 1 MHz | 47 | pF |
| | | Outputs disabled | | | 13 | |

## PARAMETER MEASUREMENT INFORMATION

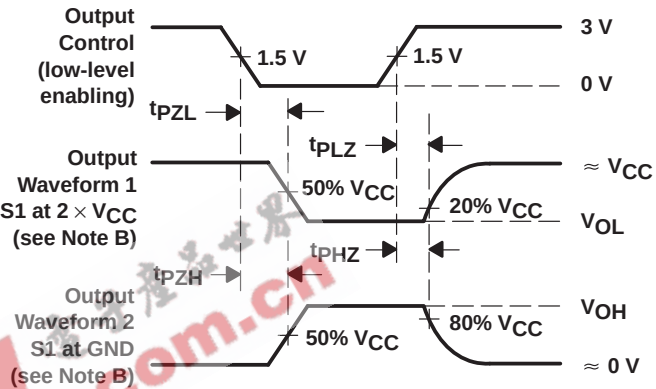



LOAD CIRCUIT

| TEST | S1 |
|---|---|
| $t_{PLH}/t_{PHL}$ | Open |
| $t_{PLZ}/t_{PZL}$ | 2 × $V_{CC}$ |
| $t_{PHZ}/t_{PZH}$ | GND |




VOLTAGE WAVEFORMS




VOLTAGE WAVEFORMS

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. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, $Z_O$ = 50 Ω, $t_r$ = 3 ns, $t_f$ = 3 ns.
D. The outputs are measured one at a time with one input transition per measurement.

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

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