

74AC11828

10-BIT BUFFER/BUS DRIVER WITH 3-STATE OUTPUTS

SCAS083A – NOVEMBER 1989 – REVISED APRIL 1993

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Flow-Through Architecture to Optimize PCB Layout
- Center-Pin V_{CC} and GND Configurations to Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance Implanted CMOS) 1- μ m Process
- 500-mA Typical Latchup Immunity at 125°C
- Package Options Include Plastic “Small Outline” Packages and Standard Plastic 300-mil DIPs

description

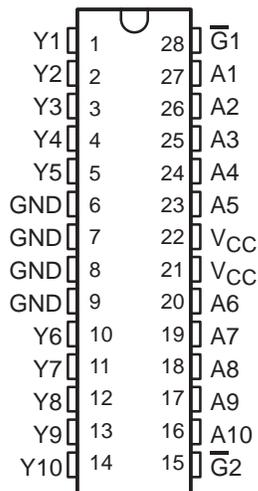
This device contains ten buffers/bus drivers that provide a high-performance 10-bit bus interface for wide data paths or buses carrying parity.

The 3-state control gate is a 2-input NOR gate. If either $\overline{G1}$ or $\overline{G2}$ is high, all ten outputs are in the high-impedance state.

The 74AC11828 provides inverted data.

The 74AC11828 is characterized for operation from -40°C to 85°C .

DW OR NT PACKAGE
(TOP VIEW)



FUNCTION TABLE

| INPUTS | | | OUTPUT |
|-----------------|-----------------|---|--------|
| $\overline{G1}$ | $\overline{G2}$ | A | Y |
| L | L | H | L |
| L | L | L | H |
| X | H | X | Z |
| H | X | X | Z |

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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

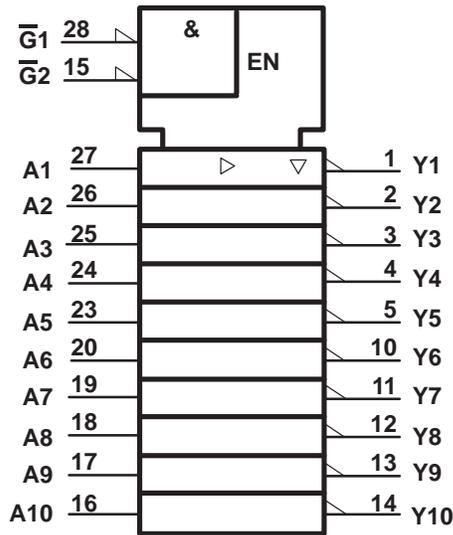


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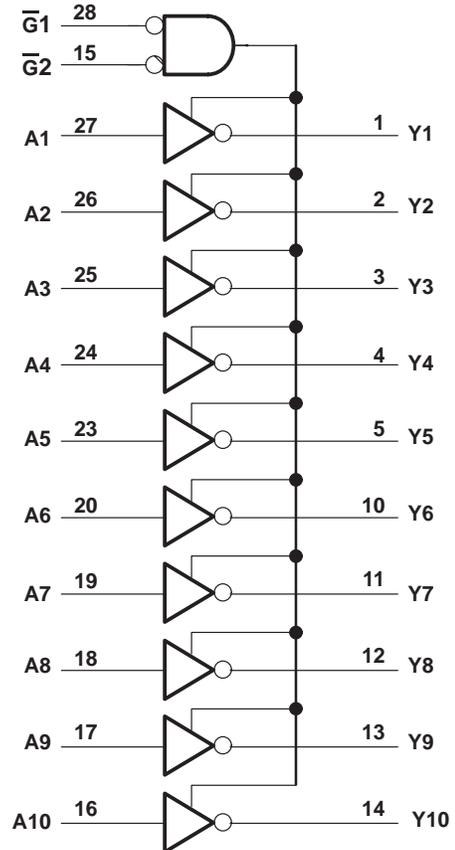
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logic symbol†



logic diagram (positive logic)



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

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

| | |
|--|----------------------------|
| Supply voltage range, V_{CC} | -0.5 V to 7 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 pins | ± 250 mA |
| 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.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

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recommended operating conditions

| | | MIN | NOM | MAX | UNIT |
|-----------------|------------------------------------|-------------------------|-----------------|-----|------|
| V _{CC} | Supply voltage | 3 | 5 | 5.5 | V |
| V _{IH} | High-level input voltage | V _{CC} = 3 V | 2.1 | | V |
| | | V _{CC} = 4.5 V | 3.15 | | |
| | | V _{CC} = 5.5 V | 3.85 | | |
| V _{IL} | Low-level input voltage | V _{CC} = 3 V | 0.9 | | V |
| | | V _{CC} = 4.5 V | 1.35 | | |
| | | V _{CC} = 5.5 V | 1.65 | | |
| V _I | Input voltage | 0 | V _{CC} | | V |
| V _O | Output voltage | 0 | V _{CC} | | V |
| I _{OH} | High-level output current | V _{CC} = 3 V | -4 | | mA |
| | | V _{CC} = 4.5 V | -24 | | |
| | | V _{CC} = 5.5 V | -24 | | |
| I _{OL} | Low-level output current | V _{CC} = 3 V | 12 | | mA |
| | | V _{CC} = 4.5 V | 24 | | |
| | | V _{CC} = 5.5 V | 24 | | |
| Δt/Δv | 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 | | | MIN | MAX | UNIT |
|---------------------------------------|---|-----------------|-----------------------|-----|------|------|-----|------|
| | | | MIN | TYP | MAX | | | |
| V _{OH} | I _{OH} = -50 μA | 3 V | 2.9 | | | 2.9 | V | |
| | | 4.5 V | 4.4 | | | 4.4 | | |
| | | 5.5 V | 5.4 | | | 5.4 | | |
| | I _{OH} = -4 mA | 3 V | 2.58 | | | 2.48 | | |
| | | 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 | 3 V | 0.1 | | | 0.1 | V | |
| | | 4.5 V | 0.1 | | | 0.1 | | |
| | | 5.5 V | 0.1 | | | 0.1 | | |
| | I _{OL} = 12 mA | 3 V | 0.36 | | | 0.44 | | |
| | | 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 | |
| C _i | V _I = V _{CC} or GND | 5 V | 4.5 | | | | pF | |
| C _o | V _O = V _{CC} or GND | 5 V | 12 | | | | pF | |

[†] Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.



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switching characteristics over recommended operating free-air temperature range, $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $T_A = 25^\circ\text{C}$ | | | MIN | MAX | UNIT |
|-----------|--------------|-------------|--------------------------|------|------|-----|------|------|
| | | | MIN | TYP | MAX | | | |
| t_{PLH} | A | Y | 5.4 | 9.8 | 12.7 | 5.4 | 14.3 | ns |
| t_{PHL} | | | 7.2 | 10.4 | 13.2 | 7.2 | 14.5 | |
| t_{PZH} | G1 or G2 | Y | 6.5 | 10.8 | 14.4 | 6.5 | 16.3 | ns |
| t_{PZL} | | | 9.5 | 15 | 19.2 | 9.5 | 21.8 | |
| t_{PHZ} | G1 or G2 | Y | 5.3 | 8.2 | 11 | 5.3 | 11.9 | ns |
| t_{PLZ} | | | 5.1 | 7.9 | 10.5 | 5.1 | 11.2 | |

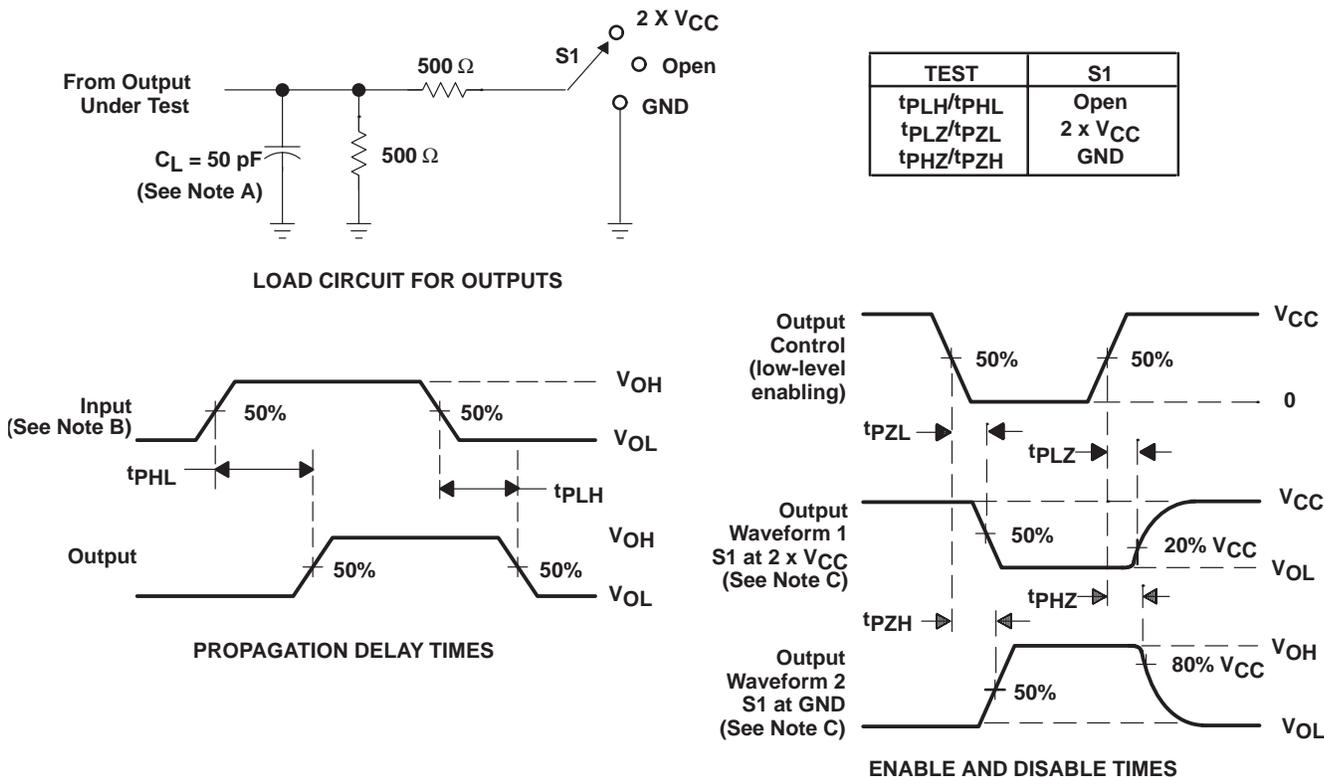
switching characteristics over recommended operating free-air temperature range, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $T_A = 25^\circ\text{C}$ | | | MIN | MAX | UNIT |
|-----------|--------------|-------------|--------------------------|-----|------|-----|------|------|
| | | | MIN | TYP | MAX | | | |
| t_{PLH} | A | Y | 2.4 | 5.2 | 7.9 | 2.4 | 9.5 | ns |
| t_{PHL} | | | 3.2 | 6.2 | 8.9 | 3.2 | 10.4 | |
| t_{PZH} | G1 or G2 | Y | 3.1 | 6.4 | 8.8 | 3.1 | 10.7 | ns |
| t_{PZL} | | | 3.8 | 7.7 | 10.5 | 3.8 | 13.2 | |
| t_{PHZ} | G1 or G2 | Y | 3.7 | 6.4 | 8.8 | 3.7 | 9.6 | ns |
| t_{PLZ} | | | 3.9 | 6.2 | 8.2 | 3.9 | 9.2 | |

operating characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

| PARAMETER | | TEST CONDITIONS | TYP | UNIT |
|-----------|-------------------------------|---|-----|------|
| C_{pd} | Power dissipation capacitance | $C_L = 50\text{ pF}$, $f = 1\text{ MHz}$ | 37 | pF |
| | | | 11 | |

PARAMETER MEASUREMENT INFORMATION



- 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 the generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
 D. The outputs are measured one at a time with one transition per measurement.

Figure 1. LOAD CIRCUIT AND VOLTAGE WAVEFORMS

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