

SN54BCT2828A, SN74BCT2828B 10-BIT BUS/MOS MEMORY DRIVERS WITH 3-STATE OUTPUTS

SCBS058A – APRIL 1987 – REVISED NOVEMBER 1993

- State-of-the-Art BiCMOS Design Significantly Reduces I_{CCZ}
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015
- Output Ports Have Equivalent 33- Ω Series Resistors, So No External Resistors Are Required
- 3-State Inverting Outputs Drive Bus Lines or Buffer Memory Address Registers
- Flow-Through Architecture Optimizes PCB Layout
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK) and Flatpacks, and Standard Plastic and Ceramic 300-mil DIPs (JT, NT)

description

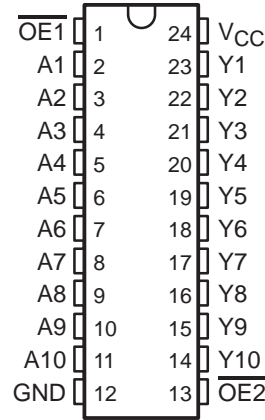
These 10-bit bus/MOS memory drivers provide a high-performance bus interface for wide data paths or buses carrying parity.

The 3-state control gate is a 2-input AND gate with active-low inputs so that if either output-enable ($\overline{OE1}$ or $\overline{OE2}$) input is high, all ten outputs are in the high-impedance state. The outputs are also in the high-impedance state during power-up and power-down conditions. The outputs remain in the high-impedance state while the device is powered down.

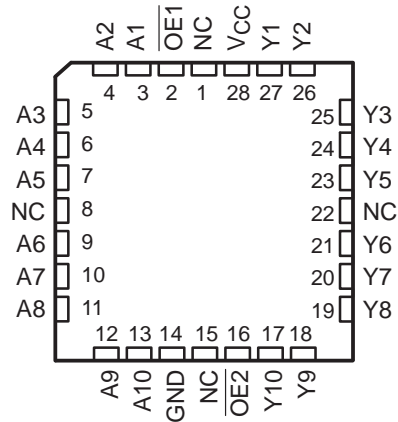
The outputs, which are designed to source or sink up to 12 mA, include 33- Ω series resistors to reduce overshoot and undershoot.

The SN54BCT2828A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74BCT2828B is characterized for operation from 0°C to 70°C .

SN54BCT2828A . . . JT OR W PACKAGE
SN74BCT2828B . . . DW OR NT PACKAGE
(TOP VIEW)



SN54BCT2828A . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

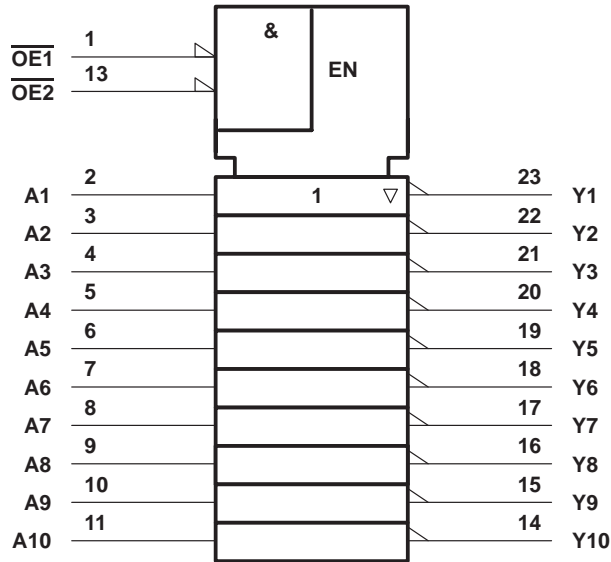
FUNCTION TABLE

| INPUTS | | | OUTPUT |
|------------------|------------------|---|--------|
| $\overline{OE1}$ | $\overline{OE2}$ | A | Y |
| L | L | L | H |
| L | L | H | L |
| H | X | X | Z |
| X | H | X | Z |

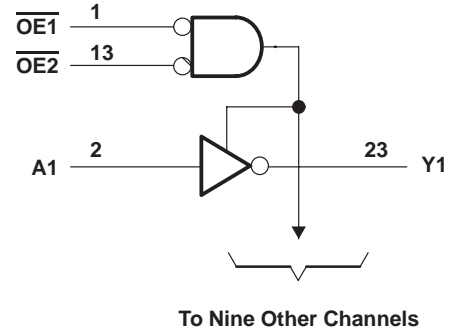
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logic symbol†



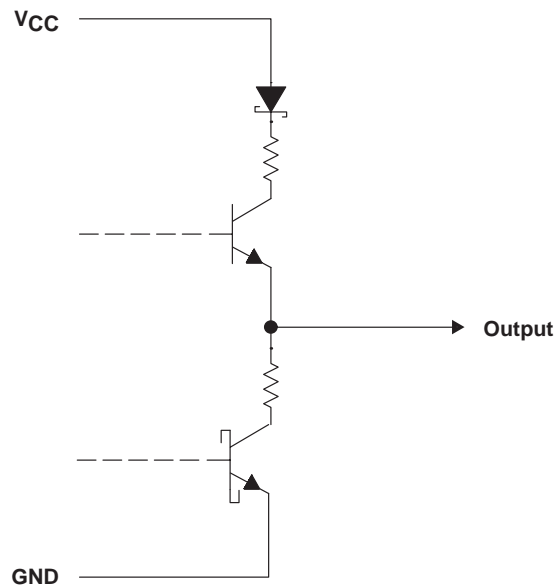
logic diagram (positive logic)



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

Pin numbers shown are for the DW, JT, NT, and W packages.

schematic of each output



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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 7 V |
| Voltage range applied to any output in the disabled or power-off state, V_O | –0.5 V to 7 V |
| Voltage range applied to any output in the high state, V_O | –0.5 V to V_{CC} |
| Input clamp current, I_{IK} ($V_I < 0$) | –30 mA |
| Current into any output in the low state, I_O | 24 mA |
| Operating free-air temperature range: SN54BCT2828A | –55°C to 125°C |
| SN74BCT2828B | 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.

NOTE 1: The input negative-voltage rating may be exceeded if the input clamp-current rating is observed.

recommended operating conditions (see Note 2)

| | | SN54BCT2828A | | | SN74BCT2828B | | | UNIT |
|----------|--------------------------------|--------------|-----|-----|--------------|-----|-----|------|
| | | MIN | NOM | MAX | MIN | NOM | MAX | |
| V_{CC} | Supply voltage | 4.5 | 5 | 5.5 | 4.5 | 5 | 5.5 | V |
| V_{IH} | High-level input voltage | 2 | | | 2 | | | V |
| V_{IL} | Low-level input voltage | | | 0.8 | | | 0.8 | V |
| I_{IK} | Input clamp current | | | –18 | | | –18 | mA |
| I_{OH} | High-level output current | | | –1 | | | –1 | mA |
| I_{OL} | Low-level output current | | | 12 | | | 12 | mA |
| T_A | Operating free-air temperature | –55 | | 125 | 0 | | 70 | °C |

NOTE 2: Unused or floating inputs must be held high or low.

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

| PARAMETER | TEST CONDITIONS | SN54BCT2828A | | | SN74BCT2828B | | | UNIT |
|--------------|---|-----------------|------|------|--------------|------|------|------|
| | | MIN | TYP‡ | MAX | MIN | TYP‡ | MAX | |
| V_{IK} | $V_{CC} = 4.5$ V, $I_I = -18$ mA | | | –1.2 | | | –1.2 | V |
| V_{OH} | $V_{CC} = 4.5$ V to 5.5 V, $I_{OH} = -1$ mA | $V_{CC}-2$ | | | $V_{CC}-2$ | | | V |
| V_{OL} | $V_{CC} = 4.5$ V | | 0.35 | 0.5 | | 0.35 | 0.5 | V |
| | | $I_{OL} = 1$ mA | | | | 0.42 | 0.8 | |
| I_I | $V_{CC} = 5.5$ V, $V_I = 7$ V | | | 0.1 | | | 0.1 | mA |
| I_{IH} | $V_{CC} = 5.5$ V, $V_I = 2.7$ V | | | 20 | | | 20 | μA |
| I_{IL} | $V_{CC} = 5.5$ V, $V_I = 0.5$ V | | | –0.2 | | | –0.2 | mA |
| I_{OZH} | $V_{CC} = 5.5$ V, $V_O = 2.7$ V | | | 20 | | | 20 | μA |
| I_{OZL} | $V_{CC} = 5.5$ V, $V_O = 0.5$ V | | | –20 | | | –20 | μA |
| I_{OL} | $V_{CC} = 4.5$ V, $V_O = 2$ V | 50 | | | 50 | | | mA |
| I_{O}^{\S} | $V_{CC} = 5.5$ V, $V_O = 2.25$ V | –30 | | –112 | –30 | | –112 | mA |
| I_{CCL} | $V_{CC} = 5.5$ V, Outputs open | | 28 | | | 28 | 40 | mA |
| I_{CCZ} | $V_{CC} = 5.5$ V, Outputs open | | 3.5 | | | 3.5 | 6 | mA |
| C_i | $V_{CC} = 5$ V, $V_I = 2.5$ V or 0.5 V | | 5 | | | 5 | | pF |
| C_o | $V_{CC} = 5$ V, $V_O = 2.5$ V or 0.5 V | | 8 | | | 8 | | pF |

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

§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.



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switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L = 50$ pF (unless otherwise noted) (see Note 3)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 5$ V, $T_A = 25^\circ$ C | | | SN54BCT2828A | | SN74BCT2828B | | UNIT |
|-----------|-----------------|----------------|---------------------------------------|-----|------|--------------|-----|--------------|------|------|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| t_{PLH} | A | Y | 1.8 | 2.7 | 5.9 | 1.5 | 10 | 1.3 | 6.6 | ns |
| t_{PHL} | | | 1.2 | 3.1 | 4.8 | 1.5 | 9 | 0.9 | 5 | |
| t_{PZH} | \overline{OE} | Y | 3.6 | 5.8 | 7.8 | 2 | 15 | 2.9 | 9 | ns |
| t_{PZL} | | | 5.5 | 7.9 | 10.2 | 2 | 21 | 4.8 | 11.5 | |
| t_{PHZ} | \overline{OE} | Y | 4.7 | 7.2 | 9.3 | 2 | 18 | 3.8 | 10.8 | ns |
| t_{PLZ} | | | 3.3 | 5.4 | 7.2 | 2 | 15 | 2.7 | 8.7 | |

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

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