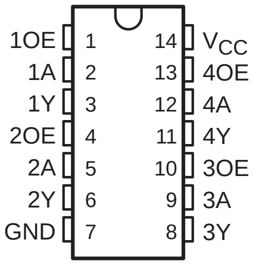
# SN54BCT126A, SN74BCT126A
# QUADRUPLE BUS BUFFER GATES WITH 3-STATE OUTPUTS

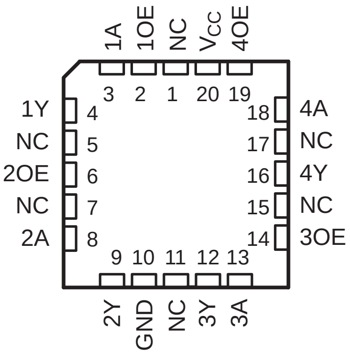
SCBS252A – SEPTEMBER 1988 – REVISED APRIL 1994

- **State-of-the-Art BiCMOS Design Significantly Reduces $I_{CCZ}$**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015**
- **3-State Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic and Ceramic 300-mil DIPs (J, N)**

**SN54BCT126A . . . J OR W PACKAGE**
**SN74BCT126A . . . D OR N PACKAGE**
**(TOP VIEW)**



**SN54BCT126A . . . FK PACKAGE**
**(TOP VIEW)**



NC – No internal connection

## description

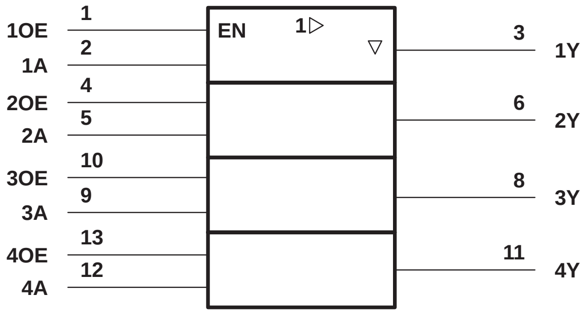
The ′BCT126A bus buffer features independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (OE) input is low.

The SN54BCT126A is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74BCT126A is characterized for operation from 0°C to 70°C.

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

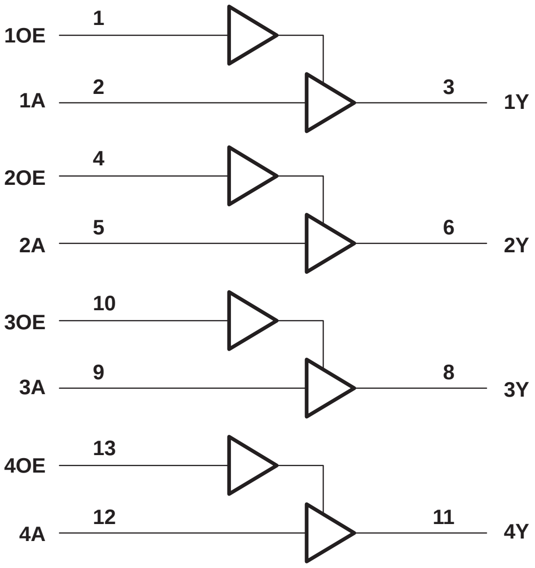
| INPUTS | | OUTPUT |
|---|---|---|
| **OE** | **A** | **Y** |
| H | H | H |
| H | L | L |
| L | X | Z |

### logic symbol†



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

### logic diagram (positive logic)



Pin numbers shown are for the J, N, and W packages.

### 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 5.5 V
Voltage range applied to any output in the high state, $V_O$ . . . . . . . . . . . . . . . . . . . . . . . . . . . . . – 0.5 V to $V_{CC}$
Current into any output in the low state: SN54BCT126A . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 96 mA
SN74BCT126A . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 128 mA
Operating free-air temperature range: SN54BCT126A . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . – 55°C to 125°C
SN74BCT126A . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 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 and output voltage ratings may be exceeded if the input and output current ratings are observed.

### recommended operating conditions

| | | SN54BCT126A | | | SN74BCT126A | | | 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 | | | –12 | | | –15 | mA |
| $I_{OL}$ | Low-level output current | | | 48 | | | 64 | mA |
| $T_A$ | Operating free-air temperature | –55 | | 125 | 0 | | 70 | °C |

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

| PARAMETER | TEST CONDITIONS | | SN54BCT126A MIN | SN54BCT126A TYP[†] | SN54BCT126A MAX | SN74BCT126A MIN | SN74BCT126A TYP[†] | SN74BCT126A MAX | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| $V_{IK}$ | $V_{CC}$ = 4.5 V, | $I_I$ = –18 mA | | | –1.2 | | | –1.2 | V |
| $V_{OH}$ | $V_{CC}$ = 4.5 V | $I_{OH}$ = –3 mA | 2.4 | 3.3 | | 2.4 | 3.3 | | V |
| | | $I_{OH}$ = –12 mA | 2 | 3.2 | | | | | |
| | | $I_{OH}$ = –15 mA | | | | 2 | 3.1 | | |
| $V_{OL}$ | $V_{CC}$ = 4.5 V | $I_{OL}$ = 48 mA | | 0.38 | 0.55 | | | | V |
| | | $I_{OL}$ = 64 mA | | | | | 0.42 | 0.55 | |
| $I_I$ | $V_{CC}$ = 0, | $V_I$ = 7 V | | | 0.1 | | | 0.1 | mA |
| $I_{IH}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 2.7 V | | | 35 | | | 25 | µA |
| $I_{IL}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 0.5 V | | | –20 | | | –20 | µA |
| $I_{OZH}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.7 V | | | 50 | | | 50 | µA |
| $I_{OZL}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 0.5 V | | | –50 | | | –50 | µA |
| $I_{OS}$[‡] | $V_{CC}$ = 5.5 V, | $V_O$ = 0 | –100 | | –225 | –100 | | –225 | mA |
| $I_{CCH}$ | $V_{CC}$ = 5.5 V, | Outputs open | | 21 | 33 | | 21 | 33 | mA |
| $I_{CCL}$ | $V_{CC}$ = 5.5 V, | Outputs open | | 35 | 51 | | 35 | 51 | mA |
| $I_{CCZ}$ | $V_{CC}$ = 5.5 V, | Outputs open | | 5 | 10 | | 5 | 10 | mA |
| $C_i$ | $V_{CC}$ = 5 V, | $V_I$ = 2.5 V or 0.5 V | | 4 | | | 4 | | pF |
| $C_o$ | $V_{CC}$ = 5 V, | $V_O$ = 2.5 V or 0.5 V | | 9 | | | 9 | | pF |

[†] All typical values are at $V_{CC}$ = 5 V.

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

### switching characteristics (see Note 2)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 5 V, $C_L$ = 50 pF, R1 = 500 Ω, R2 = 500 Ω, $T_A$ = 25°C | | | $V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, R1 = 500 Ω, R2 = 500 Ω, $T_A$ = MIN to MAX[§] | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ′BCT126A | | | SN54BCT126A | | SN74BCT126A | | |
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | A | Y | 1.5 | 3.6 | 4.9 | 1.5 | 5.6 | 1.5 | 6.3 | ns |
| $t_{PHL}$ | | | 2.7 | 5.3 | 6.9 | 2.7 | 7.7 | 2.7 | 7.4 | |
| $t_{PZH}$ | OE | Y | 2.6 | 4.8 | 6.4 | 2.6 | 7.2 | 2.6 | 7.9 | ns |
| $t_{PZL}$ | | | 3.7 | 6.4 | 8.3 | 3.7 | 10.5 | 3.7 | 10 | |
| $t_{PHZ}$ | OE | Y | 3.2 | 6.6 | 8.2 | 3.2 | 9.6 | 3.2 | 10 | ns |
| $t_{PLZ}$ | | | 3.4 | 6.5 | 8 | 3.4 | 12.3 | 3.4 | 10.7 | |

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

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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