

SN54HCT126, SN74HCT126 QUADRUPLE BUS BUFFER GATES WITH 3-STATE OUTPUTS

SCLS070A – NOVEMBER 1988 – REVISED NOVEMBER 1990

- High-Current 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Inputs Are TTL-Voltage Compatible
- Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

description

These bus buffers feature independent line drivers with 3-state outputs. Each output is disabled when the associated OE is low.

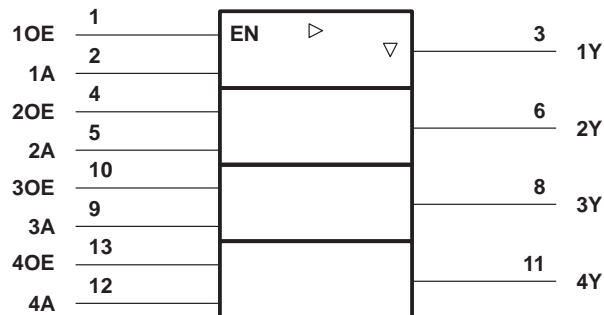
The SN54HCT126 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HCT126 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

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

H = high level, L = low level,
X = irrelevant

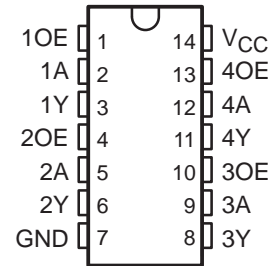
logic symbol†



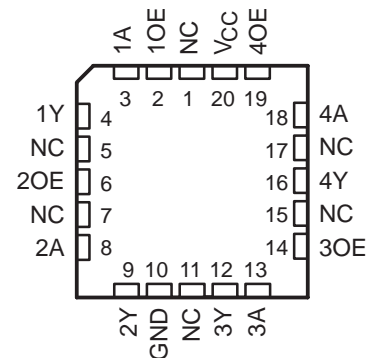
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

SN54HCT126 . . . J PACKAGE
SN74HCT126 . . . D OR N PACKAGE
(TOP VIEW)

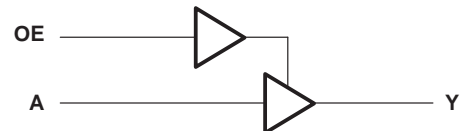


SN54HCT126 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

logic diagram, each buffer (positive logic)



SN54HCT126, SN74HCT126

QUADRUPLE BUS BUFFER GATES

WITH 3-STATE OUTPUTS

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absolute maximum ratings over operating free-air temperature†

| | |
|---|----------------|
| Supply voltage range, V_{CC} | –0.5 V to 7 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 $V_O > V_{CC}$) | ± 20 mA |
| Continuous output current, I_O ($V_O = 0$ to V_{CC}) | ± 35 mA |
| Continuous current through V_{CC} or GND pins | ± 70 mA |
| Lead temperature 1,6 mm (1/16 in) from case for 60 s: FK or J package | 300°C |
| Lead temperature 1,6 mm (1/16 in) from case for 10 s: DW or N package | 260°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

| | | | SN54HCT126 | | | SN74HCT126 | | | 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 | $V_{CC} = 4.5$ V to 5.5 V | 2 | | | 2 | | | V |
| V_{IL} | Low-level input voltage | $V_{CC} = 4.5$ V to 5.5 V | 0 | | 0.8 | 0 | | 0.8 | V |
| V_I | Input voltage | | 0 | | V_{CC} | 0 | | V_{CC} | V |
| V_O | Output voltage | | 0 | | V_{CC} | 0 | | V_{CC} | V |
| t_t | Input transition (rise and fall) time | | 0 | | 500 | 0 | | 500 | ns |
| T_A | Operating free-air temperature | | –55 | | 125 | –40 | | 85 | °C |

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

| PARAMETER | TEST CONDITIONS | V_{CC} | $T_A = 25^\circ\text{C}$ | | | SN54HCT126 | | SN74HCT126 | | UNIT |
|--------------------------|--|----------------|--------------------------|-------|-----------|------------|-----|------------|------|---------------|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| V_{OH} | $V_I = V_{IH}$ or V_{IL} , $I_{OH} = -20$ μA | 4.5 V | 4.4 | 4.499 | | 4.4 | | 4.4 | | V |
| | $V_I = V_{IH}$ or V_{IL} , $I_{OH} = -6$ mA | | 3.98 | 4.3 | | 3.7 | | 3.84 | | |
| V_{OL} | $V_I = V_{IH}$ or V_{IL} , $I_{OL} = 20$ μA | 4.5 V | | 0.001 | 0.1 | | 0.1 | | 0.1 | V |
| | $V_I = V_{IH}$ or V_{IL} , $I_{OL} = 6$ mA | | | 0.17 | 0.26 | | 0.4 | | 0.33 | |
| I_I | $V_I = V_{CC}$ or 0 | 5.5 V | ± 0.1 | | ± 100 | ± 1000 | | ± 1000 | | nA |
| I_{OZ} | $V_O = V_{CC}$ or 0, $V_I = V_{IH}$ or V_{IL} | 5.5 V | ± 0.01 | | ± 0.5 | ± 10 | | ± 5 | | μA |
| I_{CC} | $V_I = V_{CC}$ or 0, $I_O = 0$ | 5.5 V | | | 8 | 160 | | 80 | | μA |
| ΔI_{CC}^\ddagger | One input at 0.5 V or 2.4 V, Other inputs at 0 or V_{CC} | 5.5 V | | 1.4 | 2.4 | 3 | | 2.9 | | mA |
| C_i | | 4.5 V to 5.5 V | | 3 | 10 | 10* | | 10 | | pF |

* On products compliant to MIL-STD-883C, Class B, this parameter is not production tested.

‡ 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} .

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SN54HCT126, SN74HCT126
QUADRUPLE BUS BUFFER GATES
WITH 3-STATE OUTPUTS

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switching characteristics over recommended operating free-air temperature range, $C_L = 50$ pF (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V_{CC} | $T_A = 25^\circ\text{C}$ | | | SN54HCT126 | | SN74HCT126 | | UNIT |
|-----------|--------------|-------------|----------|--------------------------|-----|-----|------------|-----|------------|-----|------|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| t_{pd} | A | Y | 4.5 V | | 15 | 26 | | 39 | | 33 | ns |
| | | | 5.5 V | | 12 | 23 | | 35 | | 30 | |
| t_{en} | OE | Y | 4.5 V | | 19 | 26 | | 39 | | 33 | ns |
| | | | 5.5 V | | 15 | 23 | | 35 | | 30 | |
| t_{dis} | OE | Y | 4.5 V | | 18 | 26 | | 39 | | 33 | ns |
| | | | 5.5 V | | 15 | 23 | | 35 | | 30 | |
| t_t | | Any | 4.5 V | | 8 | 15 | | 22 | | 19 | ns |
| | | | 5.5 V | | 7 | 14 | | 21 | | 17 | |

switching characteristics over recommended operating free-air temperature range, $C_L = 150$ pF (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V_{CC} | $T_A = 25^\circ\text{C}$ | | | SN54HCT126 | | SN74HCT126 | | UNIT |
|-----------|--------------|-------------|----------|--------------------------|-----|-----|------------|-----|------------|-----|------|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| t_{pd} | A | Y | 4.5 V | | 21 | 36 | | 58 | | 46 | ns |
| | | | 5.5 V | | 17 | 32 | | 48 | | 42 | |
| t_{en} | OE | Y | 4.5 V | | 25 | 36 | | 58 | | 46 | ns |
| | | | 5.5 V | | 21 | 32 | | 48 | | 42 | |
| t_t | | Any | 4.5 V | | 17 | 42 | | 63 | | 53 | ns |
| | | | 5.5 V | | 14 | 38 | | 57 | | 48 | |

operating characteristics, $T_A = 25^\circ\text{C}$

| PARAMETER | TEST CONDITIONS | TYP | UNIT |
|--|-----------------|-----|------|
| C_{pd} Power dissipation capacitance | No load | 35 | pF |

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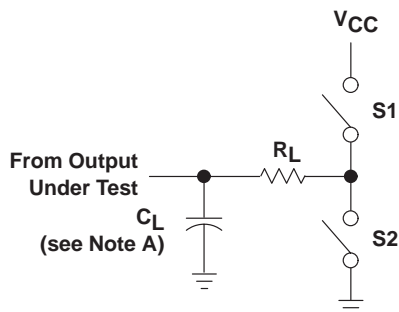


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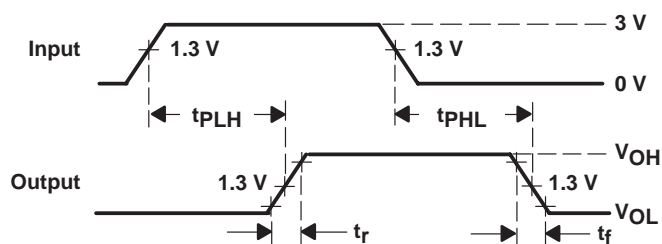
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PARAMETER MEASUREMENT INFORMATION

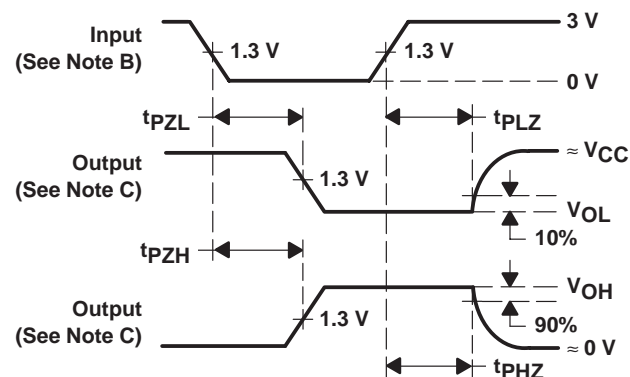


LOAD CIRCUIT

| PARAMETER | R_L | C_L | S1 | S2 |
|-------------------|--------------|-----------------|--------|--------|
| t_{en} | 1 k Ω | 50 pF or 150 pF | Open | Closed |
| | | | Closed | Open |
| t_{dis} | 1 k Ω | 50 pF | Open | Closed |
| | | | Closed | Open |
| t_{pd} or t_t | — | 50 pF or 150 pF | Open | Open |



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

- NOTES: A. C_L includes probe and jig capacitance.
B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O = 50 \Omega$, $t_r \leq 6$ ns, $t_f \leq 6$ ns.
C. 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.
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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