



UCD4049B

Preliminary

CMOS IC

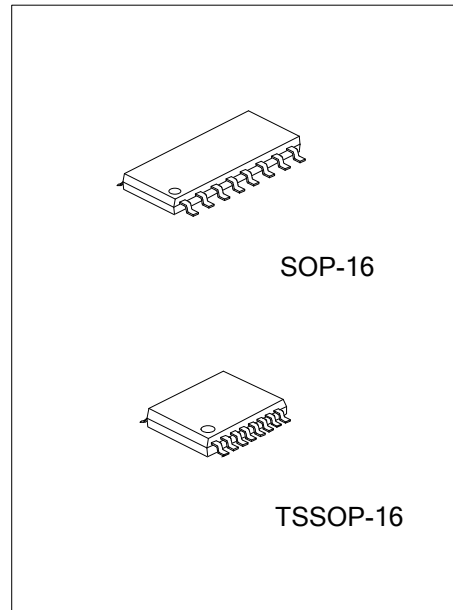
CMOS HEX BUFFER/CONVERTERS

DESCRIPTION

The **UCD4049B** devices are inverting hex buffers, and feature logic-level conversion using only one supply voltage(V_{CC}).The input-signal high level(V_{IH}) can exceed the V_{CC} supply voltage when these devices are used for logic-level conversions. These devices are intended for use as CMOS to DTL/TTL converters and can drive directly two DTL/TTL loads.

FEATURES

- * High Sink Current for Driving 2 TTL Loads
- * High-To-Low Level Logic Conversion
- * Maximum Input Current of 1uA at 18V Over Full Package Temperature Range
- * 5V, 10V and 15V Parametric Ratings

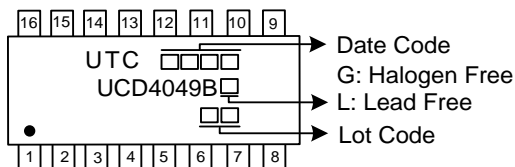


ORDERING INFORMATION

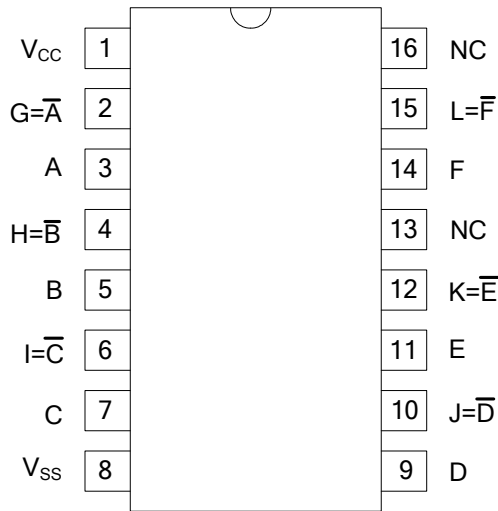
| Ordering Number | | Package | Packing |
|-----------------|-----------------|----------|-----------|
| Lead Free | Halogen Free | | |
| UCD4049BL-S16-R | UCD4049BG-S16-R | SOP-16 | Tape Reel |
| UCD4049BL-P16-R | UCD4049BG-P16-R | TSSOP-16 | Tape Reel |

| | |
|--|--|
| <p>UCD4049BG-S16-R</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package | <ul style="list-style-type: none"> (1) R: Tape Reel (2) S16: SOP-16, TSSOP-16 (3) G: Halogen Free and Lead Free, L: Lead Free |
|--|--|

MARKING



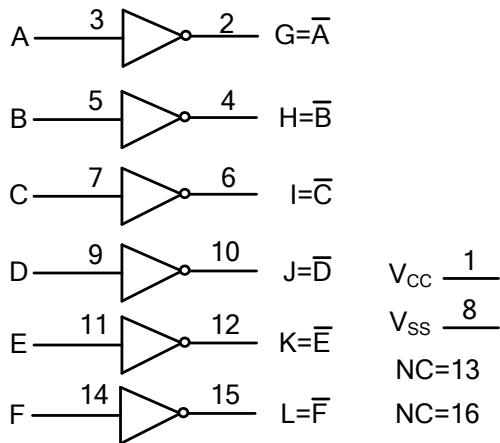
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

| INPUT(A) | OUTPUT(G) |
|----------|-----------|
| H | L |
| L | H |

■ LOGIC DIAGRAM (positive logic)



■ **ABSOLUTE MAXIMUM RATING** ($T_A = 25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|-----------|-----------------------|------------------|
| Supply Voltage | V_{CC} | -0.5 ~ 18 | V |
| Input Voltage | V_{IN} | -0.5 ~ $V_{CC} + 0.5$ | V |
| Output Voltage | V_{OUT} | -0.5 ~ $V_{CC} + 0.5$ | V |
| Storage Temperature | T_{STG} | -65 ~ +150 | $^\circ\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ **RECOMMENDED OPERATING CONDITIONS**

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------|-----------|------------|------------------|
| Supply Voltage | V_{CC} | 3 ~ 15 | V |
| Operating Temperature | T_{OPR} | -40 ~ +125 | $^\circ\text{C}$ |

■ **THERMAL DATA**

| PARAMETER | SYMBOL | RATINGS | UNIT | |
|---------------------|----------|---------------|------|--------------------|
| Junction to Ambient | SOP-16 | θ_{JA} | 73 | $^\circ\text{C/W}$ |
| | TSSOP-16 | | 108 | $^\circ\text{C/W}$ |

■ **ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|----------------------------------|---------------|---|-------|------|------|---------------|
| High-Level Input Voltage | V_{IH} | $V_{CC}=5V, V_O=0.5V$ | 3.5 | | | V |
| | | $V_{CC}=10V, V_O=1.0V$ | 7 | | | |
| | | $V_{CC}=15V, V_O=1.5V$ | 11 | | | |
| Low-Level Input Voltage | V_{IL} | $V_{CC}=5V, V_O=4.5V$ | | | 1.5 | V |
| | | $V_{CC}=10V, V_O=9.0V$ | | | 3.0 | |
| | | $V_{CC}=15V, V_O=13.5V$ | | | 4.0 | |
| High-Level Output Voltage | V_{OH} | $V_{CC}=5V, V_I=0V, \text{No Load}$ | 4.95 | 5 | | V |
| | | $V_{CC}=10V, V_I=0V, \text{No Load}$ | 9.95 | 10 | | |
| | | $V_{CC}=15V, V_I=0V, \text{No Load}$ | 14.95 | 15 | | |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=5V, V_I=5V, \text{No Load}$ | | 0 | 0.05 | V |
| | | $V_{CC}=10V, V_I=10V, \text{No Load}$ | | 0 | 0.05 | |
| | | $V_{CC}=15V, V_I=15V, \text{No Load}$ | | 0 | 0.05 | |
| High-Level Output Current (Note) | I_{OH} | $V_{CC}=5V, V_O=4.6V$ | -0.65 | -1.2 | | mA |
| | | $V_{CC}=5V, V_O=2.5V$ | -2.1 | -7.2 | | |
| | | $V_{CC}=10V, V_O=9.5V$ | -1.65 | -3.5 | | |
| | | $V_{CC}=15V, V_O=13.5V$ | -4.3 | -13 | | |
| Low-Level Output Current (Note) | I_{OL} | $V_{CC}=4.5V, V_O=0.4V$ | 2.6 | 6.5 | | mA |
| | | $V_{CC}=5V, V_O=0.4V$ | 3.2 | 7.5 | | |
| | | $V_{CC}=10V, V_O=0.5V$ | 8.0 | 16 | | |
| | | $V_{CC}=15V, V_O=1.5V$ | 24.0 | 65 | | |
| Input Leakage Current | $I_{I(LEAK)}$ | $V_{CC}=15V, V_{IN} = V_{CC} \text{ or } GND$ | | | 0.1 | μA |
| Quiescent Supply Current | I_{DD} | $V_{CC}=5V, V_{IN} = V_{CC} \text{ or } V_{SS}, I_{OUT} = 0$ | | 0.02 | 1 | μA |
| | | $V_{CC}=10V, V_{IN} = V_{CC} \text{ or } V_{SS}, I_{OUT} = 0$ | | 0.02 | 2 | |
| | | $V_{CC}=15V, V_{IN} = V_{CC} \text{ or } V_{SS}, I_{OUT} = 0$ | | 0.02 | 4 | |

Note: I_{OL} and I_{OH} are tested one output at a time.

■ SWITCHING CHARACTERISTICS

($T_A=25^\circ\text{C}$, Input: $t_R=t_F=20\text{ns}$, $C_L=50\text{pF}$, $R_L=200\text{K}\Omega$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|-----------|---------------------|-----|-----|-----|------|
| Propagation delay from Input(A or B) to Output(Y) | t_{PLH} | $V_{CC}=5\text{V}$ | | 80 | 120 | ns |
| | | $V_{CC}=10\text{V}$ | | 40 | 65 | |
| | | $V_{CC}=15\text{V}$ | | 30 | 50 | |
| | t_{PHL} | $V_{CC}=5\text{V}$ | | 40 | 65 | |
| | | $V_{CC}=10\text{V}$ | | 25 | 40 | |
| | | $V_{CC}=15\text{V}$ | | 20 | 30 | |
| Transition Time | t_{TLH} | $V_{CC}=5\text{V}$ | | 60 | 160 | ns |
| | | $V_{CC}=10\text{V}$ | | 40 | 80 | |
| | | $V_{CC}=15\text{V}$ | | 30 | 60 | |
| | t_{THL} | $V_{CC}=5\text{V}$ | | 30 | 60 | |
| | | $V_{CC}=10\text{V}$ | | 20 | 40 | |
| | | $V_{CC}=15\text{V}$ | | 15 | 30 | |

■ OPERATING CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------|----------|-----------------|-----|-----|------|------|
| Average Input Capacitance | C_{IN} | Any Input | | 15 | 22.5 | pF |

■ TEST CIRCUIT AND WAVEFORMS

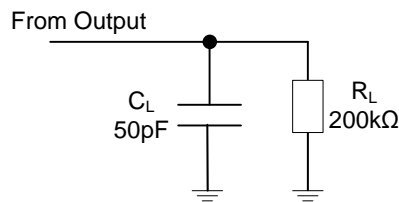


Fig 1. Definitions for test circuit

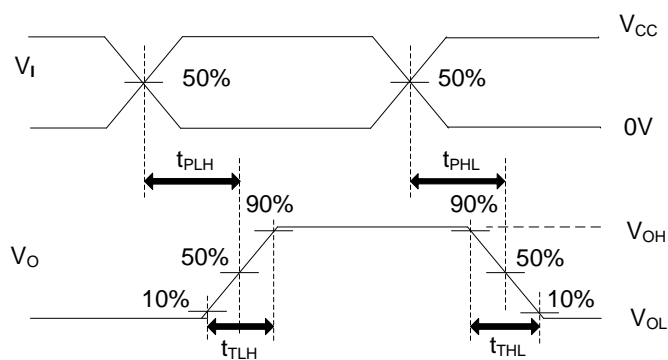


Fig 2. Propagation Delay Times

Note: C_L includes probe and jig capacitance.

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