

CD4503BC Hex Non-Inverting 3-STATE Buffer

General Description

The CD4503BC is a hex non-inverting 3-STATE buffer with high output current sink and source capability. 3-STATE outputs make it useful in bus-oriented applications. Two separate disable inputs are provided. Buffers 1 through 4 are controlled by the disable 4 input. Buffers 5 and 6 are controlled by the disable 2 input. A high level on either disable input will cause those gates on its control line to go into a high impedance state.

Features

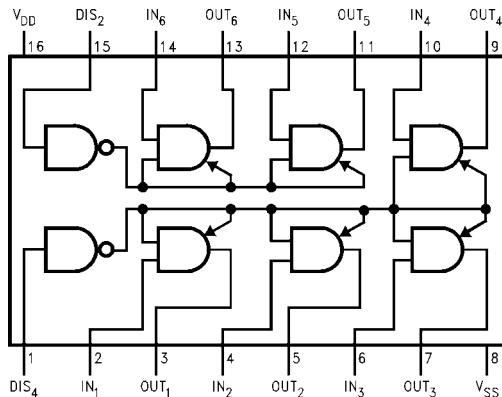
- Wide supply voltage range: $3.0 V_{DC}$ to $18 V_{DC}$
- 3-STATE outputs
- Symmetrical turn on/turn off delays
- Symmetrical output rise and fall times
- Pin-for-pin replacement for MM80C97 and MC14503

Ordering Code:

| Order Number | Package Number | Package Description |
|--------------|----------------|--|
| CD4503BCM | M16A | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |
| CD4503BCSJ | M16D | 16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| CD4503BCN | N16E | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide |

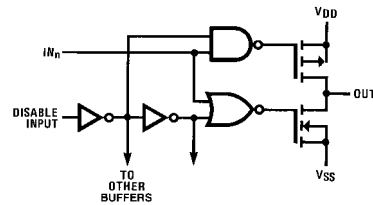
Devices also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.

Connection Diagram



Top View

Schematic Diagram



Truth Table

| In | Disable Input | Out |
|----|---------------|---------|
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| X | 1 | 3-STATE |

X = Don't Care

Absolute Maximum Ratings(Note 1)

(Note 2)

| | |
|-------------------------------------|-----------------|
| Supply Voltage (V_{DD}) | -0.5V to +18V |
| Input Voltage (V_{IN}) | -0.5V to +0.5V |
| Storage Temperature Range (T_S) | -65°C to +150°C |
| Power Dissipation (P_D) | |
| Dual-In-Line | 700 mW |
| Small Outline | 500 mW |
| Lead Temperature (T_L) | |
| (Soldering, 10 seconds) | 260°C |

Recommended Operating Conditions (Note 2)

| | |
|---------------------------------------|-----------------|
| Supply Voltage (V_{DD}) | +3V to +15V |
| Operating Temperature Range (T_A) | -55°C to +125°C |

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The tables of "Recommended Operating Conditions" and "Electrical Characteristics" provide conditions for actual device operation.

Note 2: $V_{SS} = 0V$ unless otherwise specified.

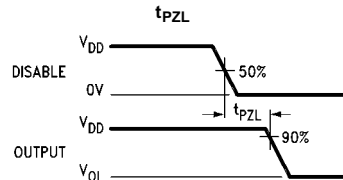
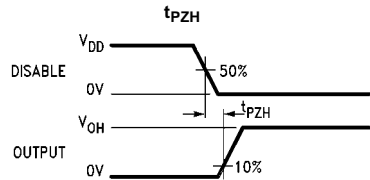
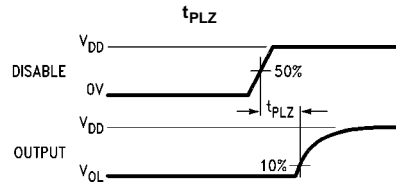
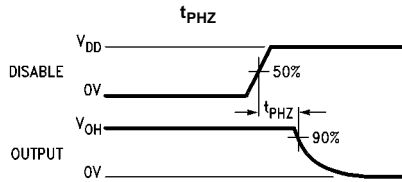
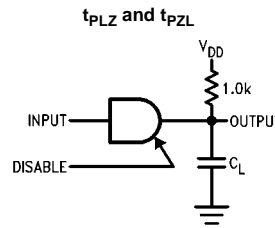
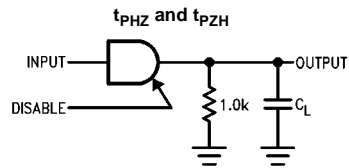
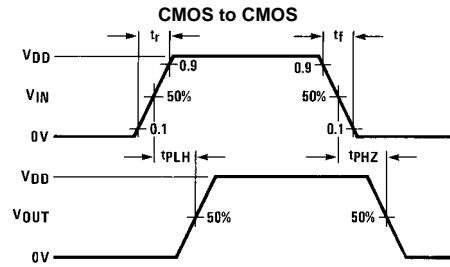
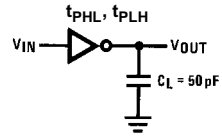
DC Electrical Characteristics (Note 2)

| Symbol | Parameter | Conditions | -55°C | | +25°C | | | +125°C | | Units |
|----------|---------------------------|--|-------|--------------|-------|---------------|--------------|--------|--------------|---------|
| | | | Min | Max | Min | Typ | Max | Min | Max | |
| I_{DD} | Quiescent Device Current | $V_{DD} = 5V,$ $V_{IN} = V_{DD}$ or V_{SS} | | 1 | | | 1 | | 30 | μA |
| | | $V_{DD} = 10V,$ $V_{IN} = V_{DD}$ or V_{SS} | | 2 | | | 2 | | 60 | |
| | | $V_{DD} = 15V,$ $V_{IN} = V_{DD}$ or V_{SS} | | 4 | | | 4 | | 120 | |
| | | $V_{DD} = 15V,$ $V_{IN} = V_{DD}$ or V_{SS} | | | | | | | | |
| V_{OL} | LOW Level Output Voltage | $V_{IN} = V_{DD}$ or 0 | | | | | | | | V |
| | | $V_{DD} = 5V$ | | 0.05 | | 0 | 0.05 | | 0.05 | |
| | | $V_{DD} = 10V$ $V_{DD} = 15V$ | | 0.05 0.05 | | 0 0 | 0.05 0.05 | | 0.05 0.05 | |
| V_{OH} | HIGH Level Output Voltage | $V_{IN} = V_{DD}$ or 0 | | | | | | | | V |
| | | $V_{DD} = 5V$ | 4.95 | | 4.95 | 5 | | 4.95 | | |
| | | $V_{DD} = 10V$ | 9.95 | | 9.95 | 10 | | 9.95 | | |
| | | $V_{DD} = 15V$ | 14.95 | | 14.95 | 15 | | 14.95 | | |
| V_{IL} | LOW Level Input Voltage | $V_{DD} = 5V,$ $V_O = 4.5V$ or $0.5V$ | | 1.5 | | 2.25 | 1.5 | | 1.5 | V |
| | | $V_{DD} = 10V,$ $V_O = 9.0V$ or $1.0V$ | | 3.0 | | 4.50 | 3.0 | | 3.0 | |
| | | $V_{DD} = 15V,$ $V_O = 13.5V$ or $1.5V$ | | 4.0 | | 6.75 | 4.0 | | 4.0 | |
| | | $V_{DD} = 15V,$ $V_O = 1.5V$ or $13.5V$ | | | | | | | | |
| V_{IH} | HIGH Level Input Voltage | $V_{DD} = 5V,$ $V_O = 0.5V$ or $4.5V$ | 3.5 | | 3.5 | 2.75 | | 3.5 | | V |
| | | $V_{DD} = 10V,$ $V_O = 1.0V$ or $9.0V$ | 7.0 | | 7.0 | 5.5 | | 7.0 | | |
| | | $V_{DD} = 15V,$ $V_O = 1.5V$ or $13.5V$ | 11.0 | | 11.0 | 8.25 | | 11.0 | | |
| | | $V_{DD} = 15V,$ $V_O = 1.5V$ or $13.5V$ | | | | | | | | |
| I_{OL} | LOW Level Output Current | $V_{DD} = 4.5V, V_{OL} = 0.4V$ | 2.8 | | 2.3 | 2.55 | | 1.60 | | mA |
| | | $V_{DD} = 5.0V, V_{OL} = 0.4V$ | 3.0 | | 2.4 | 2.75 | | 1.75 | | |
| | | $V_{DD} = 10V, V_{OL} = 0.5V$ | 7.85 | | 6.35 | 7.00 | | 4.45 | | |
| | | $V_{DD} = 15V, V_{OL} = 1.5V$ | 19.95 | | 16.10 | 25.00 | | 11.30 | | |
| I_{OH} | HIGH Level Output Current | $V_{DD} = 5V, V_{OH} = 4.6V$ | -1.28 | | -1.02 | -1.76 | | -0.7 | | mA |
| | | $V_{DD} = 10V, V_{OH} = 9.5V$ | -3.20 | | -2.60 | -4.5 | | -1.8 | | |
| | | $V_{DD} = 15V, V_{OH} = 13.5V$ | -8.20 | | -6.80 | -17.6 | | -4.8 | | |
| I_{OZ} | 3-STATE Leakage Current | $V_{DD} = 15V$ | | ± 0.1 | | $\pm 10^{-4}$ | ± 0.1 | | ± 1.0 | μA |
| I_{IN} | Input Current | $V_{DD} = 15V$ | | ± 0.1 | | $\pm 10^{-4}$ | ± 0.1 | | ± 1.0 | μA |

Note 3: I_{OH} and I_{OL} are tested one output at a time.

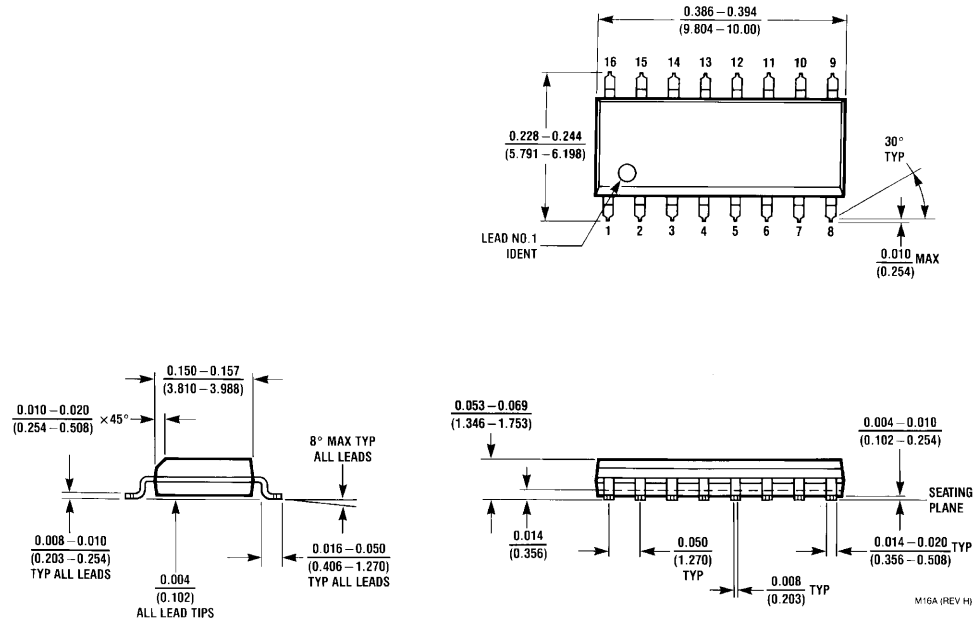
| AC Electrical Characteristics (Note 4) | | | | | | |
|---|---|--|-----|----------------|-----------------|-------|
| T _A = 25°C, C _L = 50 pF, R _L = 200 kΩ, Input t _r = t _f = 20 ns, unless otherwise specified | | | | | | |
| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
| t _{PHL} , t _{PLH} | Propagation Delay Time | V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V | | 75 35 25 | 100 40 30 | ns |
| t _{PLZ} , t _{PHZ} | Propagation Delay Time, Logical Level to HIGH Impedance State | V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V | | 80 40 35 | 125 90 70 | ns |
| t _{PZL} , t _{PZH} | Propagation Delay Time, High Impedance State to Logical Level | V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V | | 95 40 35 | 175 80 70 | ns |
| t _{TLH} | Output Rise Time | V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V | | 45 23 18 | 80 40 35 | ns |
| t _{THL} | Output Fall Time | V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V | | 45 23 18 | 80 40 35 | ns |
| Note 4: AC Parameters are guaranteed by DC correlated testing. | | | | | | |

AC Test Circuits and Switching Time Waveforms



Note: Delays measured with input $t_r, t_f \leq 20$ ns.

Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Package Number M16A

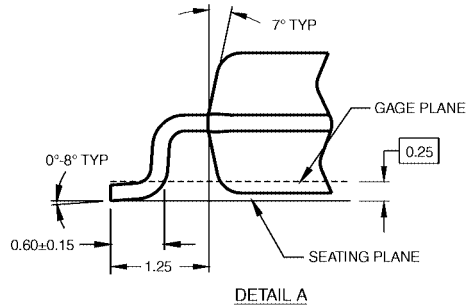
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



DIMENSIONS ARE IN MILLIMETERS

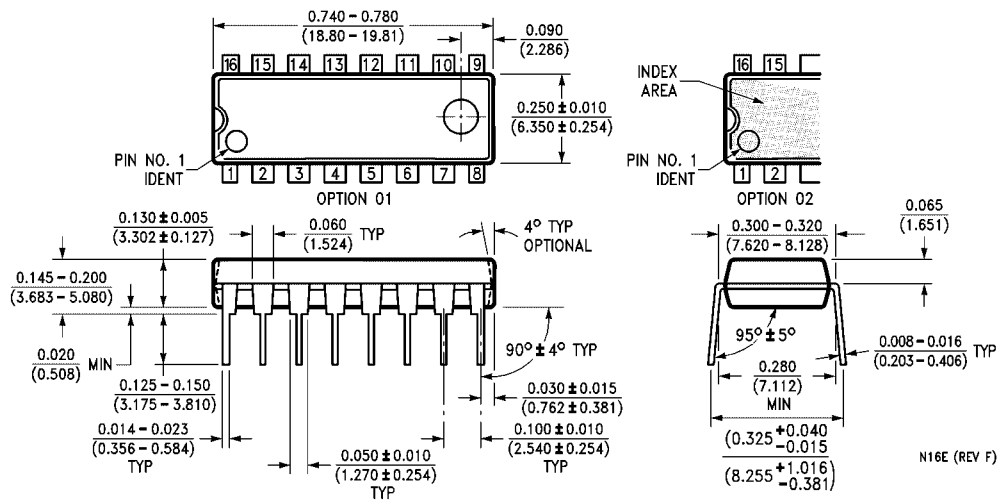
- NOTES:
 A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
 B. DIMENSIONS ARE IN MILLIMETERS.
 C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M16DRRevB1



16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M16D

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide Package Number N16E

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