



CD4503BM/CD4503BC Hex Non-Inverting TRI-STATE® Buffer

General Description

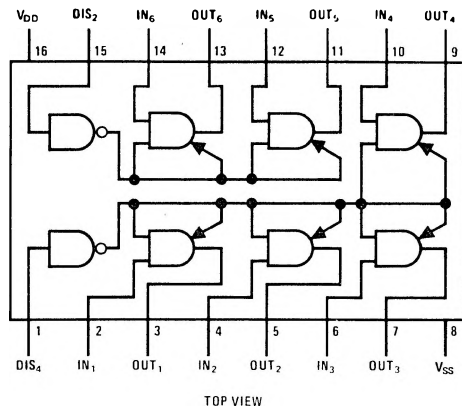
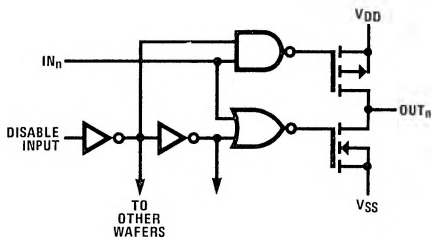
The CD4503B is a hex non-inverting TRISTATE® buffer with high output current sink and source capability. TRI-STATE outputs make it useful in bus-oriented applications. Two separate disable inputs are provided. Buffers 1 through 4 are controlled by the disable 4 input. Buffers 5 and 6 are controlled by 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.

TRI-STATE is a registered trademark of National Semiconductor Corp.

Features

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

Schematic and Connection Diagrams



Truth Table

In	Disable Input	Out
0	0	0
1	0	1
X	1	TRI-STATE

X = Don't Care

Absolute Maximum Ratings

(Notes 1 and 2)

V_{DD} – Supply Voltage	–0.5V to +18V
V_{IN} – Input Voltage	–0.5V to +0.5V
T_S – Storage Temperature Range	–65°C to +150°C
P_D – Power Dissipation	500 mW
T_L – Lead Temperature (soldering, 10 seconds)	300°C

Recommended Operating Conditions

(Note 2)

V_{DD} – Supply Voltage	3V to 15V
T_A – Operating Temperature Range	–55°C to +125°C
CD4503BM	–40°C to +85°C
CD4503BC	

DC Electrical Characteristics CD4503BM (Note 2)

Parameter	Conditions	–55°C		+25°C			+125°C		Units
		Min	Max	Min	Typ	Max	Min	Max	
I_{DD} Quiescent Device Current	$V_{DD} = 5V$		1			1		30	μA
	$V_{DD} = 10V$		2			2		60	μA
	$V_{DD} = 15V$		4			4		120	μA
V_{OL} Low Level Output Voltage	$V_{IN} = V_{DD}$ or 0								
	$V_{DD} = 5V$		0.05		0	0.05		0.05	V
	$V_{DD} = 10V$		0.05		0	0.05		0.05	V
	$V_{DD} = 15V$		0.05		0	0.05		0.05	V
V_{OH} High Level Output Voltage	$V_{IN} = V_{DD}$ or 0								
	$V_{DD} = 5V$	4.95		4.95	5		4.95		V
	$V_{DD} = 10V$	9.95		9.95	10		9.95		V
	$V_{DD} = 15V$	14.95		14.95	15		14.95		V
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
	$V_{DD} = 15V$, $V_O = 13.5V$ or 1.5V		4.0		6.75	4.0		4.0	V
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
	$V_{DD} = 15V$, $V_O = 1.5V$ or 13.5V	11.0		11.0	8.25		11.0		V
I_{OL} Low Level Output Current	$V_{DD} = 4.5V$, $V_{OL} = 0.4V$	2.80		2.30	2.55		1.60		mA
	$V_{DD} = 5.0V$, $V_{OL} = 0.4V$	3.00		2.40	2.75		1.75		mA
	$V_{DD} = 10V$, $V_{OL} = 0.5V$	7.85		6.35	7.00		4.45		mA
	$V_{DD} = 15V$, $V_{OL} = 1.5V$	19.95		16.10	25.00		11.30		mA
I_{OH} High Level Output Current	$V_{DD} = 5V$, $V_{OH} = 4.6V$	–1.28		–1.02	–1.76		–0.72		mA
	$V_{DD} = 10V$, $V_{OH} = 9.5V$	–3.20		–2.60	–4.5		–1.8		mA
	$V_{DD} = 15V$, $V_{OH} = 13.5V$	–8.20		–6.80	–17.6		–4.8		mA
I_{OZ} TRI-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 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.

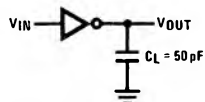
DC Electrical Characteristics CD4503BC (Note 2)

Parameter	Conditions	-40°C		+25°C			+85°C		Units
		Min	Max	Min	Typ	Max	Min	Max	
I _{DD} Quiescent Device Current	V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V		4 8 16		4 8 16			30 60 120	μA
V _{OL} Low Level Output Voltage	V _{IN} = V _{DD} or 0 V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V		0.05 0.05 0.05		0 0 0	0.05 0.05 0.05		0.05 0.05 0.05	V
V _{OH} High Level Output Voltage	V _{IN} = V _{DD} or 0 V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V	4.95 9.95 14.95		4.95 9.95 14.95			4.95 9.95 14.95		V
V _{IL} Low Level Input Voltage	V _{DD} = 5V, V _O = 4.5V or 0.5V V _{DD} = 10V, V _O = 9.0V or 1.0V V _{DD} = 15V, V _O = 13.5V or 1.5V		1.5 3.0 4.0		2.25 4.50 6.75	1.5 3.0 4.0		1.5 3.0 4.0	V
V _{IH} High Level Input Voltage	V _{DD} = 5V, V _O = 0.5V or 4.5V V _{DD} = 10V, V _O = 1.0V or 9.0V V _{DD} = 15V, V _O = 1.5V or 13.5V	3.5 7.0 11.0		3.5 7.0 11.0	2.75 5.5 8.25		3.5 7.0 11.0		V
I _{OL} Low Level Output Current	V _{DD} = 4.5V, V _{OL} = 0.4V V _{DD} = 5.0V, V _{OL} = 0.4V V _{DD} = 10V, V _{OL} = 0.5V V _{DD} = 15V, V _{OL} = 1.5V	2.30 2.5 6.5 16.50		1.95 2.10 5.45 13.80	2.65 2.75 7.0 25.00		1.60 1.75 4.45 11.30		mA
I _{OH} High Level Output Current	V _{DD} = 5V, V _{OH} = 4.6V V _{DD} = 10V, V _{OH} = 9.5V V _{DD} = 15V, V _{OH} = 13.5V	-1.04 -2.60 -7.2		-0.88 -2.2 -6.0	-1.76 -4.50 -17.6		-0.7 -1.8 -4.8		mA
I _{TL} TRI-STATE® Leakage Current	V _{DD} = 15V		±0.3		±10 ⁻⁴	±0.3		±1.0	μA
I _{IN} Input Current	V _{DD} = 15V		±0.3		±10 ⁻⁵	±0.3		±1.0	

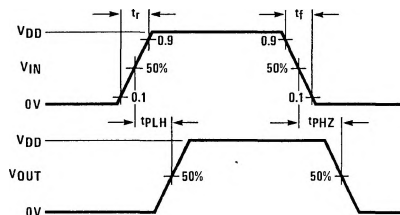
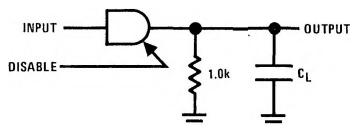
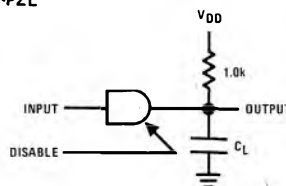
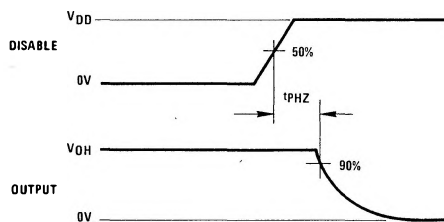
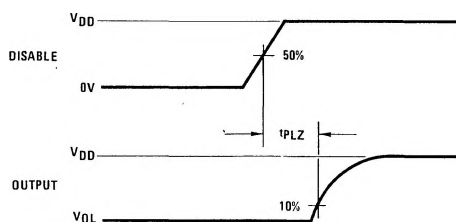
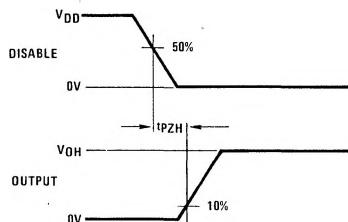
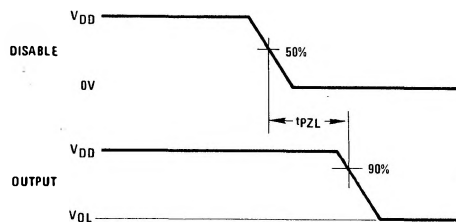
AC Electrical Characteristics CD4503BT_A = 25°C, C_L = 50 pF, R_L = 200 kΩ, Input t_r = t_f = 20 ns, unless otherwise specified.

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

AC Test Circuits and Switching Time Waveforms

 t_{PHL} , t_{PLH} 

CMOS to CMOS

 t_{PHZ} and t_{PZH}  t_{PLZ} and t_{PZL}  t_{PHZ}  t_{PLZ}  t_{PZH}  t_{PZL} 

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