

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

General Description

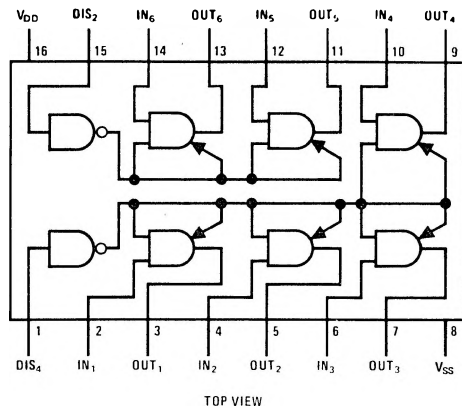
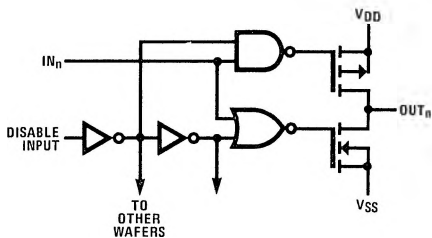
The CD4503B is a hex non-inverting TRISTATE® buffer with high output current sink and source capability. TRI-STATE outputs make it useful in bus-oriented applications. Two separate disable inputs are provided. Buffers 1 through 4 are controlled by the disable 4 input. Buffers 5 and 6 are controlled by 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	–55°C to +125°C
CD4503BC	–40°C to +85°C

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 _{DD} = 5V, V _O = 0.5V or 4.5V	3.5		3.5	2.75		3.5		V
V _{IH} High Level Input Voltage	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
	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
I _{OL} Low Level Output Current	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
	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
I _{OH} High Level Output Current	V _{DD} = 15V, V _{OH} = 13.5V	–8.20		–6.80	–17.6		–4.8		mA
	V _{DD} = 15V		±0.1		±10 ^{–4}	±0.1		±1.0	μA
	V _{DD} = 15V		±0.1		±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)

CD4503BM/CD4503BC

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

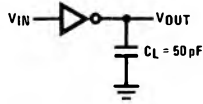
AC Electrical Characteristics CD4503B

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

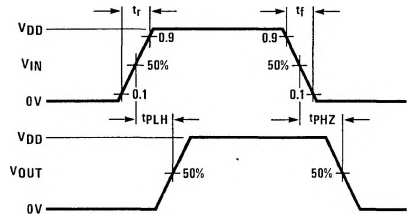
Parameter	Conditions	Min	Typ	Max	Units
t _{PHL} , t _{PLH} Propagation Delay Time	V _{DD} = 5V		75	100	ns
	V _{DD} = 10V		35	40	ns
	V _{DD} = 15V		25	30	ns
t _{PLZ} , t _{PHZ} Propagation Delay Time, Logical Level to High Impedance State	V _{DD} = 5V		80	125	ns
	V _{DD} = 10V		40	90	ns
	V _{DD} = 15V		35	70	ns
t _{PZL} , t _{PZH} Propagation Delay Time, High Impedance State to Logical Level	V _{DD} = 5V		95	175	ns
	V _{DD} = 10V		40	80	ns
	V _{DD} = 15V		35	70	ns
t _{TLH} Output Rise Time	V _{DD} = 5V		45	80	ns
	V _{DD} = 10V		23	40	ns
	V _{DD} = 15V		18	35	ns
t _{THL} Output Fall Time	V _{DD} = 5V		45	80	ns
	V _{DD} = 10V		23	40	ns
	V _{DD} = 15V		18	35	ns

AC Test Circuits and Switching Time Waveforms

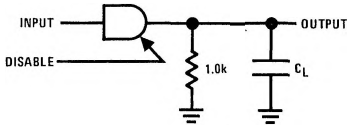
t_{PHL} , t_{PLH}



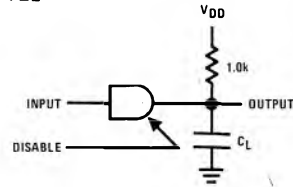
CMOS to CMOS



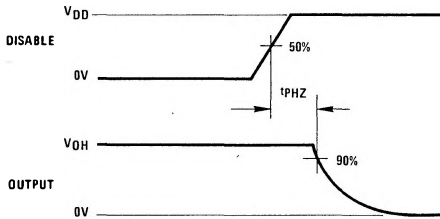
t_{PHZ} and t_{PZH}



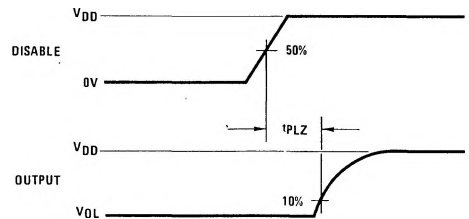
t_{PLZ} and t_{PZL}



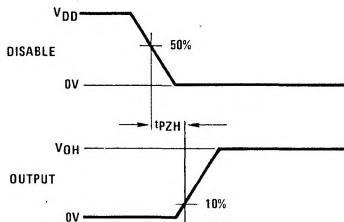
t_{PHZ}



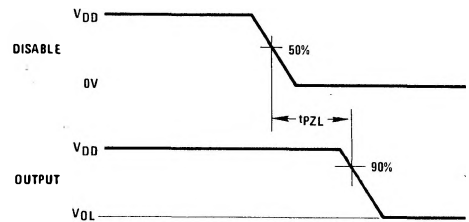
t_{PLZ}



t_{PZH}



t_{PZL}



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