

# HD14503B

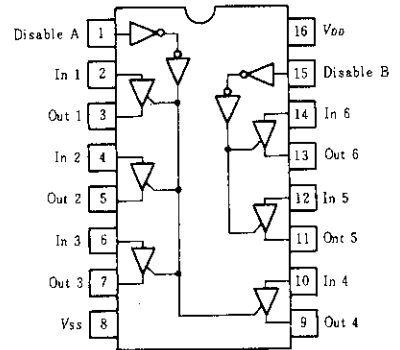
## Hex Non-inverting 3-state Buffer

The HD14503B is a hex non-inverting buffer with 3-state outputs, and a high current source and sink capability. The 3-state outputs make it useful in common bussing applications. Two disable controls are provided. A high level on the Disable A input causes the outputs of buffers 1 through 4 to go into a high impedance state and a high level on the Disable B input causes the outputs of buffers 5 and 6 to go into a high impedance state.

### FEATURES

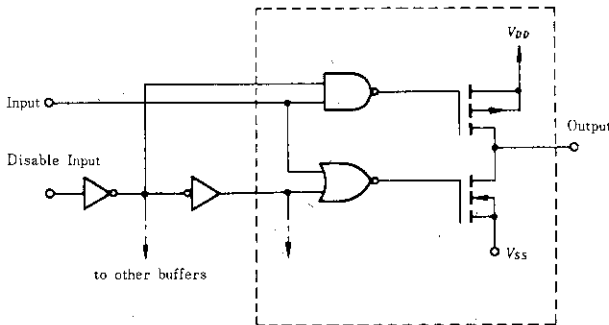
- 3-state Outputs
- TTL Compatible ... Will Drive One TTL Load Over Full Temperature Range
- Supply Voltage Range = 3 to 18V
- Symmetrical Turn-on and Turn-off Delays
- Symmetrical Output Rise and Fall Times
- Two Disable Controls for Added Versatility
- Pin-for-Pin Replacement for MC14503B

### PIN ARRANGEMENT



(Top View)

### LOGIC DIAGRAM



Diode protection on all inputs(not shown)

### TRUTH TABLE

In	Disable	Out
0	0	0
1	0	1
×	1	High Impedance

× - Don't Care

### MAXIMUM RATINGS (Voltages referenced to $V_{SS}$ )

Characteristic	Symbol	Value	Unit
DC Supply Voltage	$V_{DD}$	-0.5~+18	V
Input Voltage	$V_{is}$	-0.5~ $V_{DD}+0.5$	V
Output Voltage	$V_{out}$	-0.5~ $V_{DD}+0.5$	V
DC Current Drain per Input Pin	$I_{is}$	10	mA
DC Current Drain per Output Pin	$I_{out}$	25	mA
Operating Temperature Range	$T_A$	-40~+85	°C
Storage Temperature Range	$T_{stg}$	-65~+150	°C
Power Dissipation	$P_D$	300	mW

**ELECTRICAL CHARACTERISTICS**

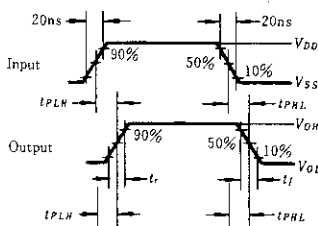
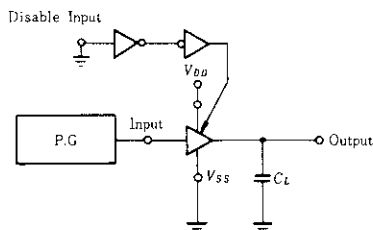
Characteristic	Symbol	V <sub>DD</sub> (V)	Test Conditions	-40°C		25°C			85°C		Unit
				min	max	min	typ	max	min	max	
Output Voltage	V <sub>OL</sub>	5.0	V <sub>in</sub> = V <sub>DD</sub> or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V <sub>OH</sub>	5.0	V <sub>in</sub> = 0 or V <sub>DD</sub>	4.95	—	4.95	5.0	—	4.95	—	V
		10		9.95	—	9.95	10	—	9.95	—	
		15		14.95	—	14.95	15	—	14.95	—	
Input Voltage	V <sub>IL</sub>	5.0	V <sub>out</sub> = 3.6 or 1.4V	—	1.5	—	2.25	1.5	—	1.5	V
		10	V <sub>out</sub> = 7.2 or 2.8V	—	3.0	—	4.50	3.0	—	3.0	
		15	V <sub>out</sub> = 11.5 or 3.5V	—	3.75	—	6.75	3.75	—	3.75	
	V <sub>IH</sub>	5.0	V <sub>out</sub> = 1.4 or 3.6V	3.5	—	3.5	2.75	—	3.5	—	V
		10	V <sub>out</sub> = 2.8 or 7.2V	7.0	—	7.0	5.5	—	7.0	—	
		15	V <sub>out</sub> = 3.5 or 11.5V	11.25	—	11.25	8.25	—	11.25	—	
Output Drive Current	I <sub>OH</sub>	4.75	V <sub>OH</sub> = 2.5V	-4.30	—	-3.60	-7.25	—	-2.60	—	mA
		5.0	V <sub>OH</sub> = 2.5V	-5.00	—	-4.20	-8.40	—	-3.40	—	
		5.0	V <sub>OH</sub> = 4.6V	-1.04	—	-0.88	-1.76	—	-0.72	—	
		10	V <sub>OH</sub> = 9.5V	-2.60	—	-2.20	-4.50	—	-1.80	—	
	I <sub>OL</sub>	4.75	V <sub>OL</sub> = 0.4V	1.7	—	1.4	2.65	—	1.1	—	mA
		5.0	V <sub>OL</sub> = 0.4V	1.9	—	1.6	2.75	—	1.3	—	
Input Current	I <sub>in</sub>	15	V <sub>in</sub> = 0	—	±0.3	—	±0.0001	±3.0	—	±1.0	μA
		15	V <sub>in</sub> = 0	—	—	—	5.0	7.5	—	—	pF
		5.0	Zero Signal, per Package	—	1.0	—	0.002	1.0	—	30	μA
		10		—	2.0	—	0.004	2.0	—	60	
Total Supply Current*	I <sub>T</sub>	5.0	Dynamic + I <sub>DD</sub> ,	—	—	—	2.5	—	—	μA	
		10	per Gate	—	—	—	6.0	—	—		
		15	C <sub>L</sub> = 50pF, f = 1kHz	—	—	—	10	—	—		
		15	C <sub>L</sub> = 50pF, f = 1kHz	—	—	—	10	—	—		
Three-State Output Leakage Current	I <sub>TL</sub>	15		—	±1.0	—	±0.0001	±1.0	—	±7.5	μA

\* To calculate total supply current at frequency other than 1kHz.

@ V<sub>DD</sub> = 5.0V I<sub>T</sub> = (2.5μA/kHz) f + I<sub>DD</sub>, @ V<sub>DD</sub> = 10V I<sub>T</sub> = (6.0μA/kHz) f + I<sub>DD</sub>, @ V<sub>DD</sub> = 15V I<sub>T</sub> = (10μA/kHz) f + I<sub>DD</sub>

**SWITCHING TIME TEST CIRCUIT**

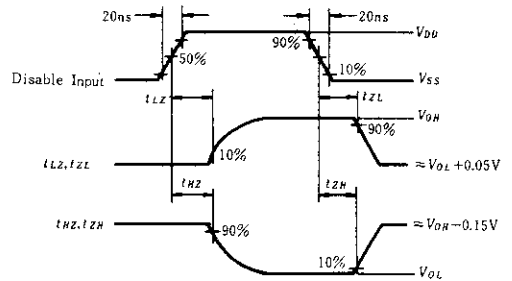
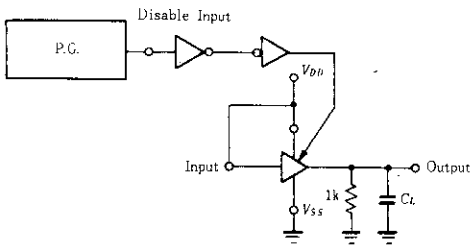
● t<sub>PLH</sub>, t<sub>PHL</sub>



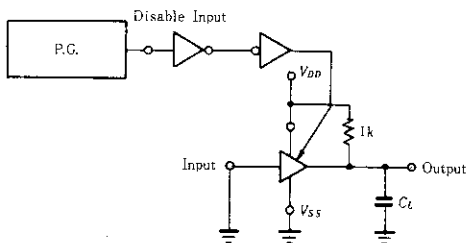
■SWITCHING CHARACTERISTICS ( $C_L=50\text{pF}$ ,  $T_a=25^\circ\text{C}$ )

Characteristic	Symbol	$V_{DD}$ (V)	min	typ	max	Unit
Output Rise Time	$t_r$	5.0	—	45	90	ns
		10	—	23	45	
		15	—	18	35	
Output Fall Time	$t_f$	5.0	—	45	90	ns
		10	—	23	45	
		15	—	18	35	
Propagation Delay Time	$t_{PLH}$	5.0	—	75	150	ns
		10	—	35	70	
		15	—	25	50	
	$t_{PHL}$	5.0	—	75	150	ns
		10	—	35	70	
		15	—	25	50	
Output Disable Time	$t_{HZ}$	5.0	—	75	150	ns
		10	—	40	80	
		15	—	35	70	
	$t_{LZ}$	5.0	—	80	160	ns
		10	—	40	80	
		15	—	35	70	
Output Enable Time	$t_{ZH}$	5.0	—	65	130	ns
		10	—	25	50	
		15	—	20	40	
	$t_{ZL}$	5.0	—	100	200	ns
		10	—	35	70	
		15	—	25	50	

●  $t_{HZ}$ ,  $t_{ZH}$



●  $t_{LZ}$ ,  $t_{ZL}$





Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.24 g



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	FP-16DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.15 g

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