HD14503B

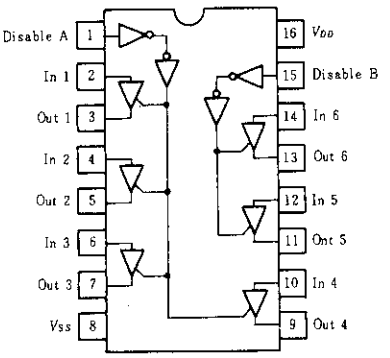
Hex Non-inverting 3-state Buffer

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

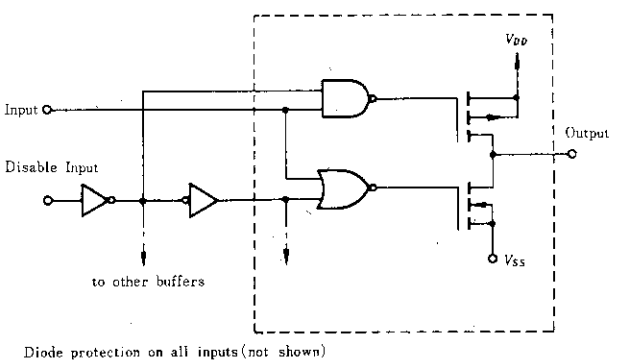
- 3-state Outputs
- TTL Compatible ... Will Drive One TTL Load Over Full Temperature Range
- Supply Voltage Range = 3 to 18V
- Symmetrical Turn-on and Turn-off Delays
- Symmetrical Output Rise and Fall Times
- Two Disable Controls for Added Versatility
- Pin-for-Pin Replacement for MC14503B

■ 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_{in}	−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_{in}	10	mA
DC Current Drain per Output Pin	I_{out}	25	mA
Operating Temperature Range	T_A	−40~+85	℃
Storage Temperature Range	T_{stg}	−65~+150	℃
Power Dissipation	P_D	300	mW

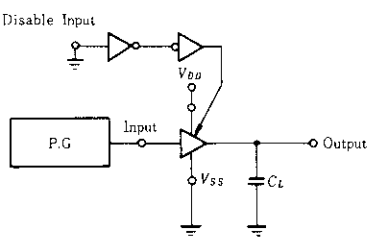
■ ELECTRICAL CHARACTERISTICS

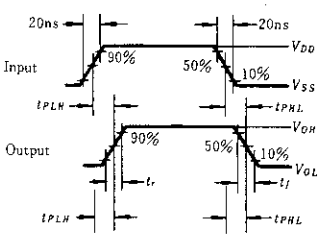
Characteristic	Symbol	V_{DD}(V)	Test Conditions	−40°C min	−40°C max	25°C min	25°C typ	25°C max	85°C min	85°C max	Unit
Output Voltage	V_{OL}	5.0	$V_{in}=V_{DD}$ or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V_{OH}	5.0	$V_{in}=0$ or V_{DD}	4.95	—	4.95	5.0	—	4.95	—	V
		10		9.95	—	9.95	10	—	9.95	—	
		15		14.95	—	14.95	15	—	14.95	—	
Input Voltage	V_{IL}	5.0	$V_{out}=3.6$ or 1.4V	—	1.5	—	2.25	1.5	—	1.5	V
		10	$V_{out}=7.2$ or 2.8V	—	3.0	—	4.50	3.0	—	3.0	
		15	$V_{out}=11.5$ or 3.5V	—	3.75	—	6.75	3.75	—	3.75	
	V_{IH}	5.0	$V_{out}=1.4$ or 3.6V	3.5	—	3.5	2.75	—	3.5	—	V
		10	$V_{out}=2.8$ or 7.2V	7.0	—	7.0	5.5	—	7.0	—	
		15	$V_{out}=3.5$ or 11.5V	11.25	—	11.25	8.25	—	11.25	—	
Output Drive Current	I_{OH}	4.75	$V_{OH}=2.5$V	−4.30	—	−3.60	−7.25	—	−2.60	—	mA
		5.0	$V_{OH}=2.5$V	−5.00	—	−4.20	−8.40	—	−3.40	—	
		5.0	$V_{OH}=4.6$V	−1.04	—	−0.88	−1.76	—	−0.72	—	
		10	$V_{OH}=9.5$V	−2.60	—	−2.20	−4.50	—	−1.80	—	
		15	$V_{OH}=13.5$V	−7.20	—	−6.00	−17.60	—	−4.80	—	
	I_{OL}	4.75	$V_{OL}=0.4$V	1.7	—	1.4	2.65	—	1.1	—	mA
		5.0	$V_{OL}=0.4$V	1.9	—	1.6	2.75	—	1.3	—	
		10	$V_{OL}=0.5$V	4.8	—	4.0	7.00	—	3.2	—	
		15	$V_{OL}=1.5$V	12.0	—	10.0	20.0	—	8.0	—	
Input Current	I_{in}	15		—	±0.3	—	±0.00001	±3.0	—	±1.0	μA
Input Capacitance	C_{in}		$V_{in}=0$	—	—	—	5.0	7.5	—	—	pF
Quiescent Current	I_{DD}	5.0	Zero Signal, per Package	—	1.0	—	0.002	1.0	—	30	μA
		10		—	2.0	—	0.004	2.0	—	60	
		15		—	4.0	—	0.006	4.0	—	120	
Total Supply Current*	I_T	5.0	Dynamic+I_{DD},	—	—	—	2.5	—	—	—	μA
		10	per Gate	—	—	—	6.0	—	—	—	
		15	$C_L=50$pF, $f=1$kHz	—	—	—	10	—	—	—	
Three-Statate Output Leakage Current	I_{TL}	15		—	±1.0	—	±0.0001	±1.0	—	±7.5	μA

* To calculate total supply current at frequency other than 1kHz.
@$V_{DD}=5.0$V $I_T=(2.5\mu A/kHz)f+I_{DD}$, @$V_{DD}=10$V $I_T=(6.0\mu A/kHz)f+I_{DD}$, @$V_{DD}=15$V $I_T=(10\mu A/kHz)f+I_{DD}$

■ SWITCHING TIME TEST CIRCUIT

● t_{PLH}, t_{PHL}

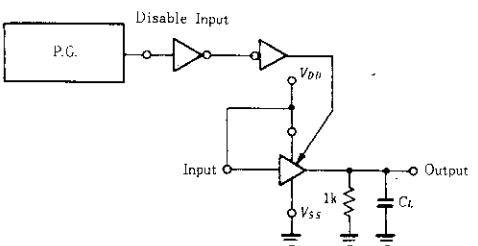




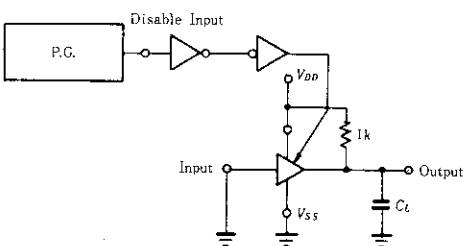
■SWITCHING CHARACTERISTICS (C_L=50pF, Ta=25°C)

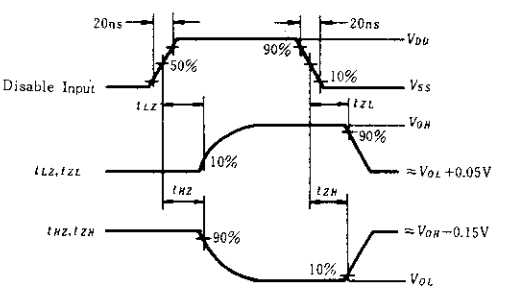
Characteristic	Symbol	V_{DD} (V)	min	typ	max	Unit
Output Rise Time	t_r	5.0	—	45	90	ns
		10	—	23	45	
		15	—	18	35	
Output Fall Time	t_f	5.0	—	45	90	ns
		10	—	23	45	
		15	—	18	35	
Propagation Delay Time	t_{PLH}	5.0	—	75	150	ns
		10	—	35	70	
		15	—	25	50	
	t_{PHL}	5.0	—	75	150	ns
		10	—	35	70	
		15	—	25	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}

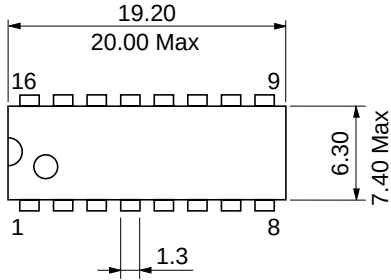


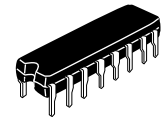
● t_{LZ}, t_{ZL}

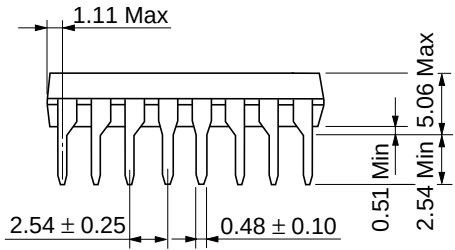


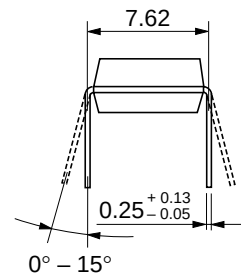


Unit: mm



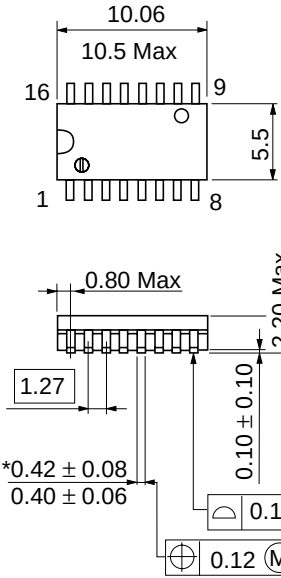


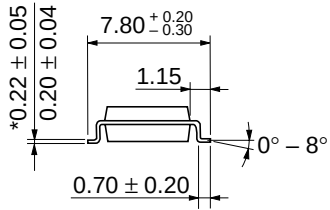


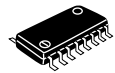


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g

Unit: mm



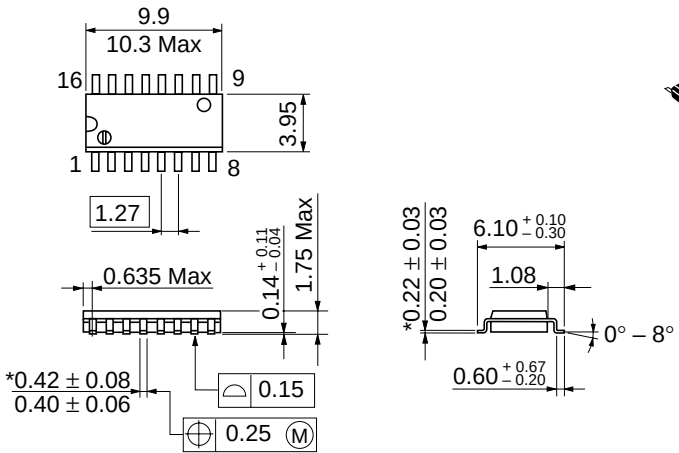




*Dimension including the plating thickness
Base material dimension

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

Unit: mm



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

*Dimension including the plating thickness
Base material dimension

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