HD14502B

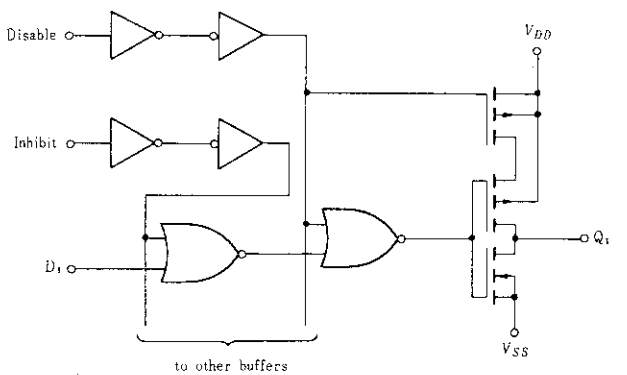
Strobed Hex Inverter/Buffer

The HD14502B is a strobe hex buffer/Inverter with 3-state output, an inhibit control, and guaranteed TTL drive over the temperature range. The 3-state output simplifies design by allowing a common bus.

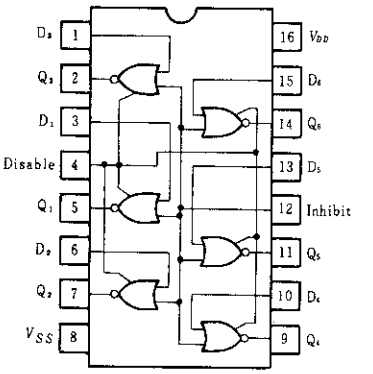
■ FEATURES

- Quiescent Current = 2nA/pkg typ. @5V
- 3-state Output
- Output Impedance = 200Ω @5V Supply Guaranteed Over Full Temperature Range
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range

■ LOGIC DIAGRAM



■ PIN ARRANGEMENT



(Top View)

■ TRUTH TABLE

Dn	Inhibit	Disable	Qn
0	0	0	1
1	0	0	0
×	1	0	0
×	×	1	High Impedance

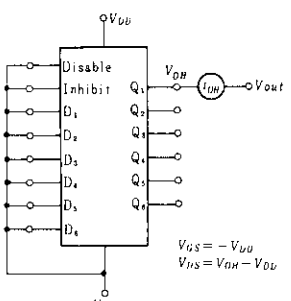
× = Don't Care

■ MAXIMUM RATINGS (Voltages referenced to V_{SS})

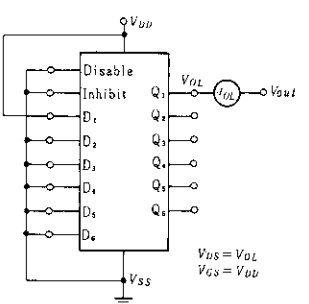
Characteristic	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	−0.5~+18	V
Input Voltage	V_{in}	−0.5~V_{DD}+0.5	V
DC Current Drain per Input Pin	I_{in}	10	mA
DC Current Drain per Output Pin	I_{out}	30	mA
Operating Temperature Range	T_A	−40~+85	°C
Storage Temperature Range	T_{stg}	−65~+150	°C
Power Dissipation	P_D	300	mW

■ DC CHARACTERISTIC TEST CIRCUIT

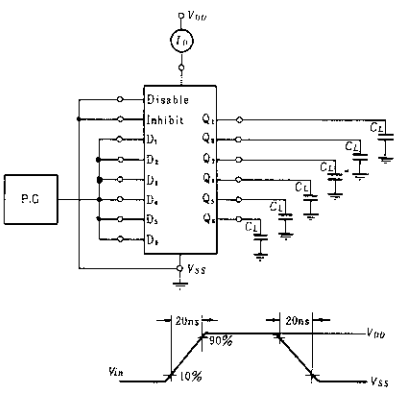
● I_{OH}



● I_{OL}



● POWER DISSIPATION TEST CIRCUIT AND WAVEFORM



■ELECTRICAL CHARACTERISTICS

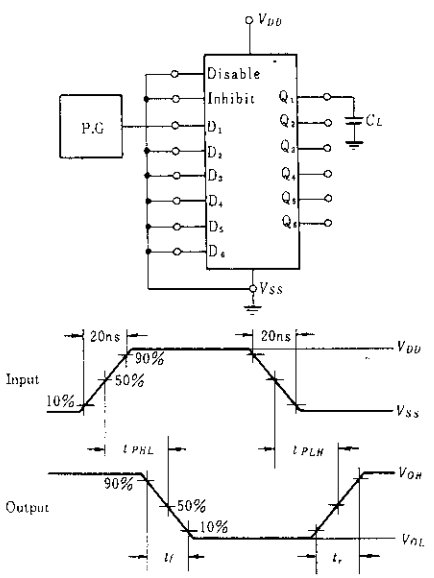
Characteristic	Symbol	V_{DD}(V)	Test Conditions	−40°C min	−40°C max	25°C min	25°C typ	25°C max	85°C min	85°C max	Unit
Output Voltage	V_{OL}	5.0	V_{in} = V_{DD} or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V_{OH}	5.0	V_{in} = 0 or V_{DD}	4.95	—	4.95	5.0	—	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} = 4.5 or 0.5V	—	1.5	—	2.25	1.5	—	1.5	V
		10	V_{out} = 9.0 or 1.0V	—	3.0	—	4.50	3.0	—	3.0	
		15	V_{out} = 13.5 or 1.5V	—	4.0	—	6.75	4.0	—	4.0	
	V_{IH}	5.0	V_{out} = 0.5 or 4.5V	3.5	—	3.5	2.75	—	3.5	—	V
		10	V_{out} = 1.0 or 9.0V	7.0	—	7.0	5.50	—	7.0	—	
		15	V_{out} = 1.5 or 13.5V	11.0	—	11.0	8.25	—	11.0	—	
Output Drive Current	I_{OH}	5.0	V_{OH} = 2.5V	−1.0	—	−0.8	−1.7	—	−0.6	—	mA
		5.0	V_{OH} = 4.6V	−0.2	—	−0.16	−0.36	—	−0.12	—	
		10	V_{OH} = 9.5V	−0.5	—	−0.4	−0.9	—	−0.3	—	
		15	V_{OH} = 13.5V	−1.4	—	−1.2	−3.5	—	−1.0	—	
	I_{OL}	5.0	V_{OL} = 0.4V	2.3	—	1.9	6.6	—	1.6	—	mA
		10	V_{OL} = 0.5V	5.0	—	4.2	17	—	3.4	—	
		15	V_{OL} = 1.5V	19	—	16	66	—	13	—	
Input Current	I_{in}	15		—	±0.3	—	±0.00001	±0.3	—	±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	—	4.0	—	0.002	4.0	—	30	μA
		10		—	8.0	—	0.004	8.0	—	60	
		15		—	16	—	0.006	16	—	120	
Total Supply Current*	I_T	5.0	Dynamic + I_{DL}, per Gate C_L = 50pF, f = 1kHz	—	—	—	2.7	—	—	—	μA
		10		—	—	—	5.3	—	—	—	
		15		—	—	—	8.0	—	—	—	
Three-State Output Leakage Current	I_{TL}	15		—	±1.0	—	±0.00001	±1.0	—	±7.5	μA

* To calculate total supply current at frequency other than 1kHz.
@ V_{DD} = 5.0V I_T = (2.7μA/kHz)f + I_{DD} @ V_{DD} = 10V I_T = (5.3μA/kHz)f + I_{DD} @ V_{DD} = 15V I_T = (8.0μA/kHz)f + I_{DD}

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

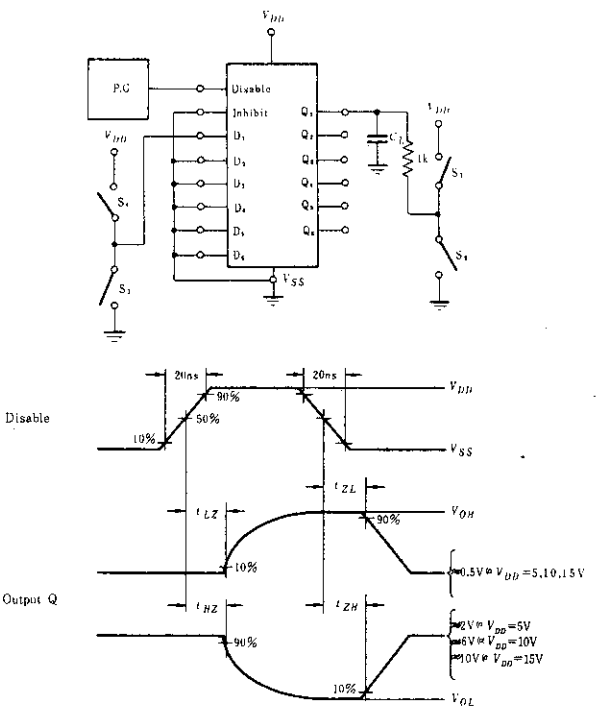
Characteristic	Symbol	V_{DD}(V)	min	typ	max	Unit
Output Rise Time	t_r	5.0	—	180	360	ns
		10	—	90	180	
		15	—	65	130	
Output Fall Time	t_f	5.0	—	60	100	ns
		10	—	30	60	
		15	—	20	40	
Propagation Delay Time	t_{PHL}	5.0	—	350	590	ns
		10	—	140	260	
		15	—	100	190	
	t_{PLH}	5.0	—	295	590	ns
		10	—	130	260	
		15	—	95	190	
Output Enable Time	t_{ZH}	5.0	—	260	520	ns
		10	—	105	210	
		15	—	80	160	
	t_{ZL}	5.0	—	160	320	ns
		10	—	65	130	
		15	—	50	100	
Output Disable Time	t_{HZ}	5.0	—	80	130	ns
		10	—	60	110	
		15	—	55	100	
	t_{LZ}	5.0	—	150	300	ns
		10	—	70	140	
		15	—	55	110	

■ AC TEST CIRCUIT

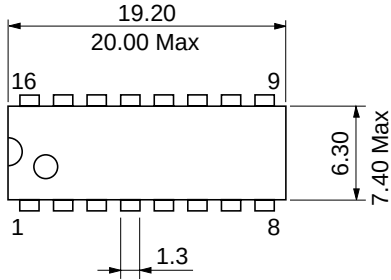


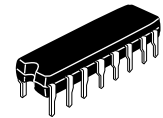
■ TESTING METHOD

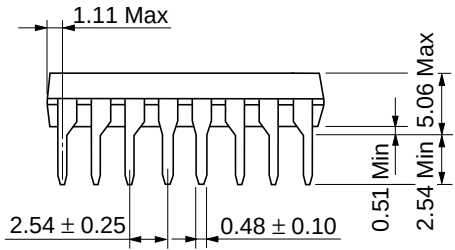
Item	S_1	S_2	S_3	S_4
t_{HZ}	Open	Closed	Closed	Open
t_{LZ}	Closed	Open	Open	Closed
t_{ZL}	Closed	Open	Open	Closed
t_{ZH}	Open	Closed	Closed	Open

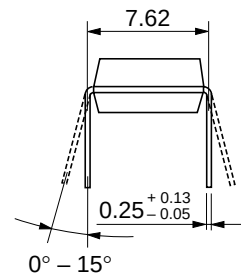


Unit: mm









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

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