HD14007UB

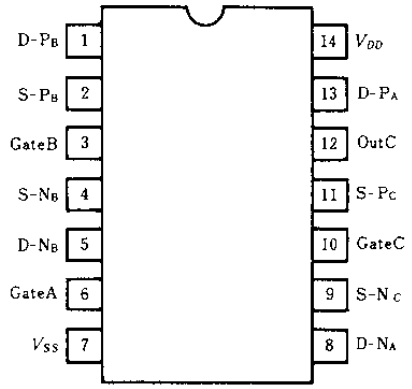
Dual Complementary Pair plus Inverter

The HD14007UB multi-purpose device consists of three N-channel and three P-channel enhancement mode devices packaged to provide access to each device. These versatile parts are useful in inverter circuits, pulse-shapers, linear amplifiers, high input impedance amplifiers, threshold detectors, transmission gating, and functional gating.

■ FEATURES

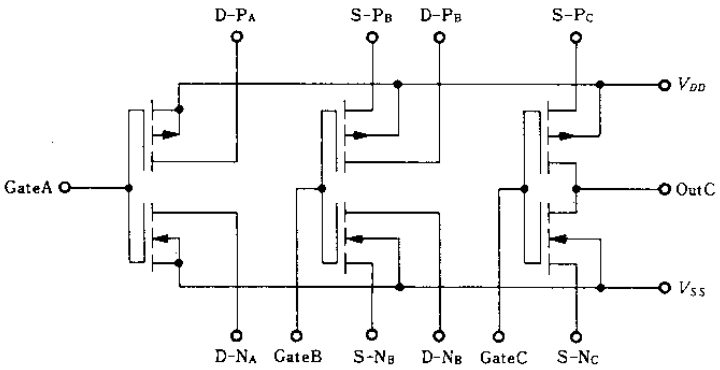
- Quiescent Current = 0.5nA/pkg typ @5V
- Supply Voltage Range = 3 to 18V
- Pin-for-Pin Replacement for CD4 007UB and MC14007UB

■ PIN ARRANGEMENT



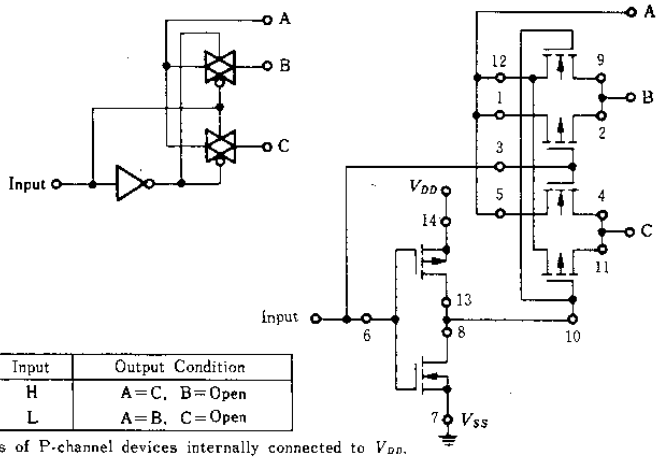
(Top View)

■ CIRCUIT SCHEMATIC



■ TYPICAL APPLICATION

(2-input Analog Multiplexer)

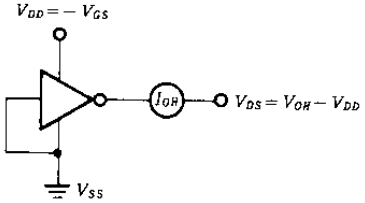


Input	Output Condition
H	A=C, B=Open
L	A=B, C=Open

Substrates of P-channel devices internally connected to V_{DD}.
Substrates of N-channel devices internally connected to V_{SS}.

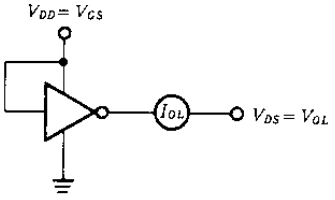
■ DC CHARACTERISTIC TEST CIRCUIT

● I_{OH}



All unused inputs connected to ground.

● I_{OL}



All unused inputs connected to ground.

HITACHI

■ ELECTRICAL CHARACTERISTICS

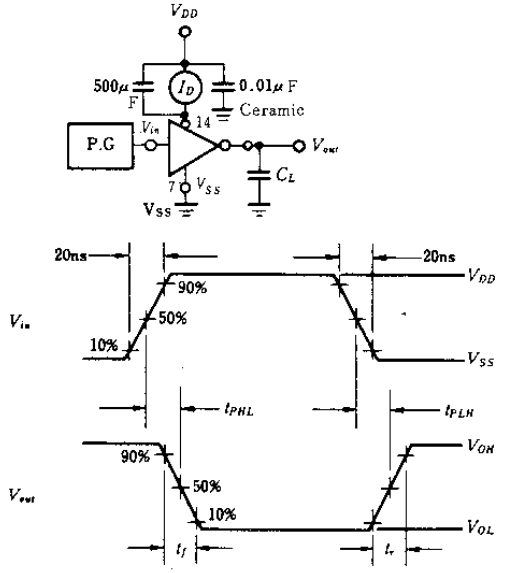
Characteristic	Symbol	V_{DD}(V)	Test Conditions	−40℃ min	−40℃ max	25℃ min	25℃ typ	25℃ max	85℃ min	85℃ max	Unit
Output Voltage	V_{OL}	5.0	$V_{in}=V_{DD}$ or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V_{OH}	5.0	V_{in}=0 or V_{DD}	4.95	—	4.95	5.0	—	4.95	—	V
		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	—	1.0	—	2.25	1.0	—	1.0	V
		10	V_{out}= 9.0 or 1.0V	—	2.0	—	4.50	2.0	—	2.0	
		15	V_{out}=13.5 or 1.5V	—	2.5	—	6.75	2.5	—	2.5	
	V_{IH}	5.0	V_{out}= 0.5 or 4.5V	4.0	—	4.0	2.75	—	4.0	—	V
		10	V_{out}= 1.0 or 9.0V	8.0	—	8.0	5.50	—	8.0	—	
		15	V_{out}= 1.5 or 13.5V	12.5	—	12.5	8.25	—	12.5	—	
Output Drive Current	I_{OH}	5.0	V_{OH}= 2.5V	−1.3	—	−1.1	−5.0	—	−0.9	—	mA
		10	V_{OH}= 9.5V	−0.65	—	−0.55	−2.5	—	−0.45	—	
		15	V_{OH}= 13.5V	−2.4	—	−2.0	−10	—	−1.6	—	
	I_{OL}	5.0	V_{OL}= 0.4V	0.52	—	0.44	1.0	—	0.36	—	mA
		10	V_{OL}= 0.5V	1.3	—	1.1	2.5	—	0.9	—	
		15	V_{OL}= 1.5V	4.0	—	3.3	10	—	2.7	—	
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	—	0.5	—	0.0005	0.5	—	3.8	μA
		10		—	1.0	—	0.0010	1.0	—	7.5	
		15		—	2.0	—	0.0015	2.0	—	15	
Total Supply Current*	I_T	5.0	Dynamic+I_{DD}, per Gate, C_L=50pF, f=1kHz	—	—	—	0.72	—	—	—	μA
		10		—	—	—	1.44	—	—	—	
		15		—	—	—	2.16	—	—	—	

* To calculate total supply current at frequency other than 1kHz.
@ V_{DD}=5.0V I_T=(0.72μA/kHz)f+I_{DD}, @V_{DD}=10V I_T=(1.44μA/kHz)f+I_{DD}, @V_{DD}=15V I_T=(2.16μA/kHz)f+I_{DD}

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

Characteristic	Symbol	V_{DD}(V)	typ	max	Unit
Output Rise Time	t_r	5.0	90	180	ns
		10	45	90	
		15	35	70	
Output Fall Time	t_f	5.0	75	150	ns
		10	40	80	
		15	30	60	
Propagation Delay Time	t_{PLH}	5.0	60	130	ns
		10	30	75	
		15	25	55	
	t_{PHL}	5.0	60	130	ns
		10	30	75	
		15	25	55	

■ SWITCHING TIME TEST CIRCUIT



■DC CHARACTERISTICS (V_{CC}=5V±10%, Ta=−40 to +85°C)

Item	Symbol	Test Condition		min	typ	max	Unit
Input Voltage	V_{IH}	V_{out}=0.1V or V_{CC}−0.1V,		2.0	—	—	V
	V_{IL}	I_{out}≦20μA		—	—	0.8	V
Output Voltage	V_{OH}	V_{in}=V_{IH} or V_{IL}, I_{out}≦20μA		V_{CC}−0.05	V_{CC}	—	V
	V_{OL}			—	0.0	0.05	V
Output Current	I_{OH}	V_{in}=V_{IH} or V_{IL}, V_{out}=V_{CC}−0.8V		—	—	−6.0	mA
	I_{OL}	V_{in}=V_{IH} or V_{IL}, V_{out}=0.4V		6.0	—	—	mA
Input Current	I_{in}	V_{in}=V_{CC} or GND		—	±0.00001	±1.0	μA
3-state Leakage Current	I_{TL}		Ta=25°C	—	—	0.5	μA
			Ta=85°C	—	—	5.0	μA
Quiescent Current	I_{CC}	V_{in}=V_{CC} or GND,	Ta=25°C	—	—	4.0	μA
		I_{out}=0μA	Ta=85°C	—	—	40	μA

■AC CHARACTERISTICS (V_{CC}=5V, Ta=25°C, Input t_r=t_f=6ns)

Item	Symbol	Test Condition	min	typ	max	Unit
Maximum Clock Frequency	f_{max}	C_L=50pF	—	—	30	MHz
Propagation Delay Time	t_{PLH} t_{PHL}	C_L=50pF	—	—	28	ns
Output Enable Time	t_{ZL}	C_L=50pF, R_L=1kΩ	—	—	30	ns
	t_{ZH}		—	—	30	
Output Disable Time	t_{LZ}	C_L=50pF, R_L=1kΩ	—	—	25	ns
	t_{HZ}		—	—	25	
Setup Time	t_{su}		20	—	—	ns
Hold Time	t_h		—	—	—	ns
Pulse Width	t_w		16	—	—	ns
Input Capacitance	C_{in}		—	—	10	pF

●Switching Waveforms

Figure 1

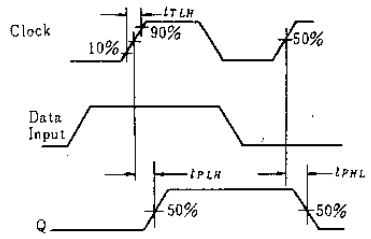


Figure 2a

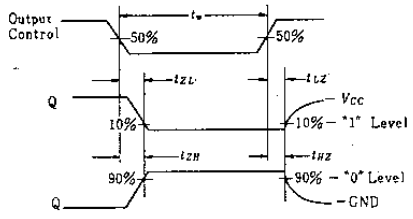


Figure 2b - Load Circuit for Three-State Outputs

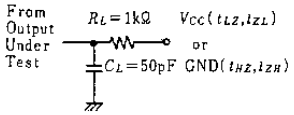
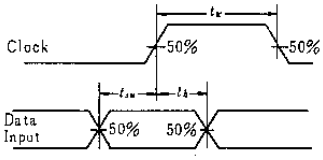
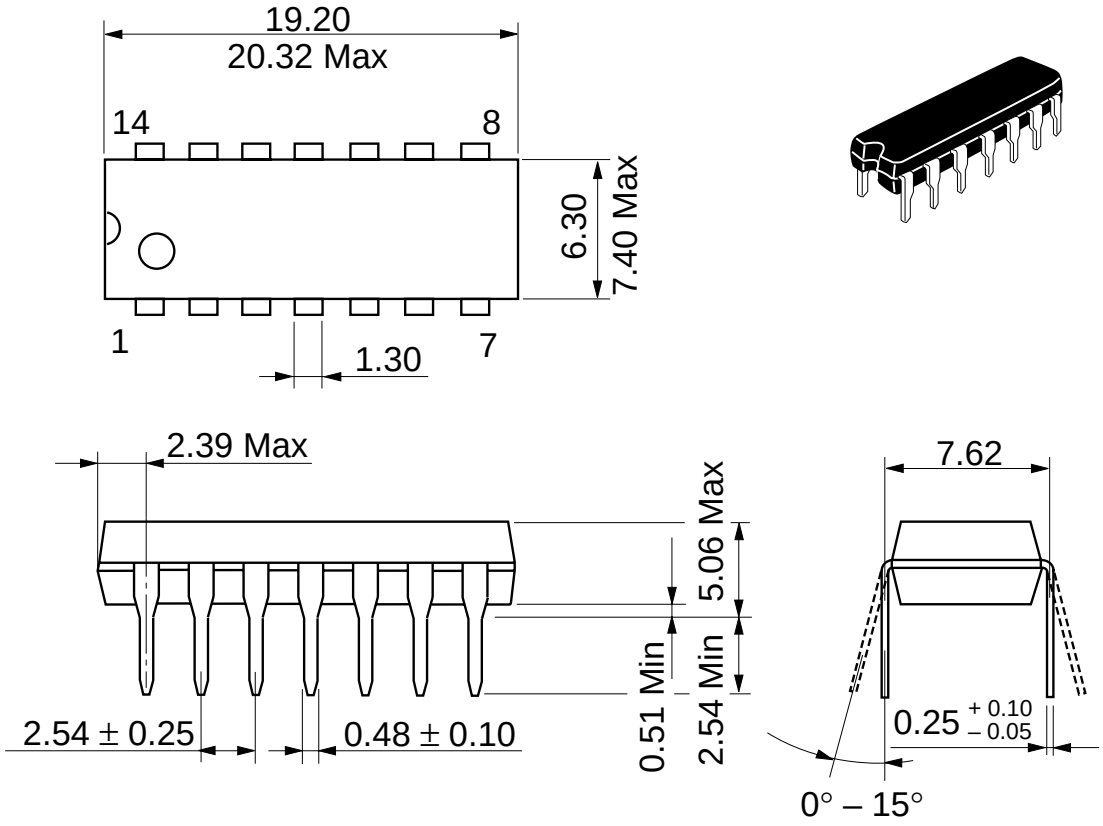


Figure 3



*Outputs Q shown are for the HCT374. Outputs for the HCT534 are the inversion of those for the HCT374.

Unit: mm



Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g

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