

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HC07AP, TC74HC07AF

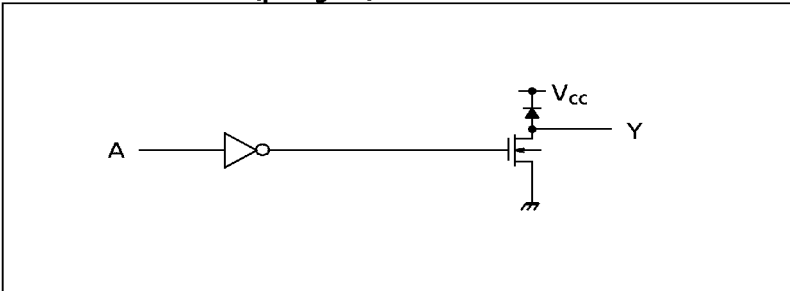
HEX BUFFER (OPEN DRAIN)

The TC74HC07A is a high speed CMOS BUFFER fabricated with silicon gate C²MOS technology. It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation. Pin configuration and function are the same as the TC74HCT7007A. But the TC74HC07A has high performance MOS N - channel transistor (OPEN - DRAIN) outputs. This device can, therefore, with a suitable pull - up resistors, be used in wired - AND, LED driver and other applications. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

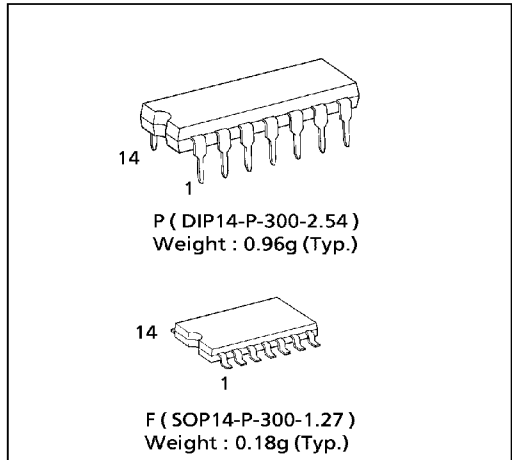
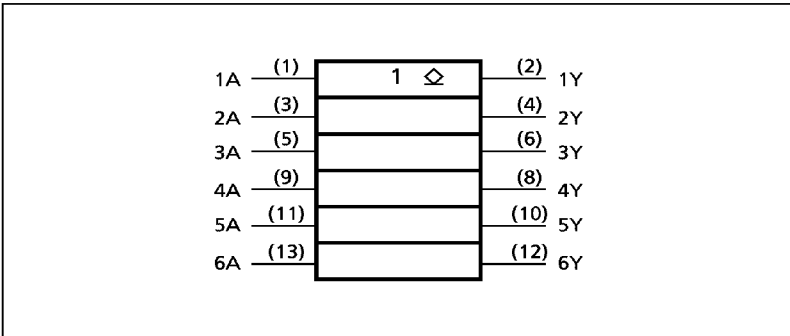
FEATURES :

- High Speed..... $t_{pz} = 5ns(\text{typ.})$ at $V_{CC} = 5V$
- Low Power Dissipation..... $I_{CC} = 1\mu A(\text{Max.})$ at $T_a = 25^\circ C$
- High Noise Immunity..... $V_{NIH} = V_{NIL} = 28\% V_{CC} (\text{Min.})$
- Output Drive Capability..... 10 LSTTL Loads
- Wide Operating Voltage Range..... $V_{CC} (\text{opr.}) = 2V \sim 6V$
- Open Drain Structure.
- Pin and Function Compatible with 74LS07

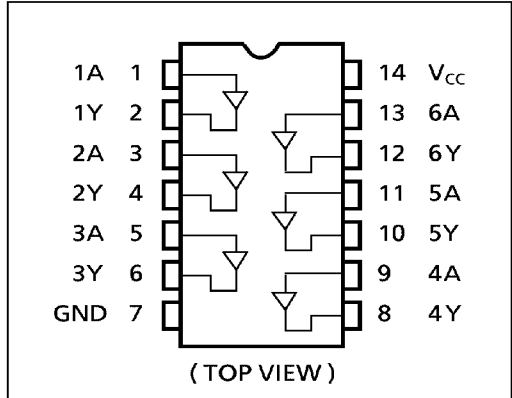
SYSTEM DIAGRAM (per gate)



IEC LOGIC SYMBOL



PIN ASSIGNMENT



TRUTH TABLE

A	Y
L	L
H	Z

Z : High Impedance

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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V _{CC}	- 0.5~7	V
DC Input Voltage	V _{IN}	- 0.5~V _{CC} +0.5	V
DC Output Voltage	V _{OUT}	- 0.5~V _{CC} +0.5	V
Input Diode Current	I _{IK}	± 20	mA
Output Diode Current	I _{OK}	± 20	mA
DC Output Current	I _{OUT}	± 25	mA
DC V _{CC} / Ground Current	I _{CC}	± 50	mA
Power Dissipation	P _D	500 (DIP)* / 180 (SOP)	mW
Storage Temperature	T _{stg}	- 65~150	°C

*500mW in the range of Ta = -40°C~65°C. From Ta = 65°C to 85°C a derating factor of -10mW/°C shall be applied until 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V _{CC}	2~6	V
Input Voltage	V _{IN}	0~V _{CC}	V
Output Voltage	V _{OUT}	0~V _{CC}	V
Operating Temperature	T _{opr}	- 40~85	°C
Input Rise and Fall Time	t _r , t _f	0~ 1000 (V _{CC} = 2.0V) 0~ 500 (V _{CC} = 4.5V) 0~ 400 (V _{CC} = 6.0V)	ns

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	V _{CC} (V)	Ta = 25°C			Ta = -40~85°C		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.		
High - Level Input Voltage	V _{IH}		2.0 4.5 6.0	1.50 3.15 4.20	— — —	— — —	1.50 3.15 4.20	— — —	V	
Low - Level Input Voltage	V _{IL}		2.0 4.5 6.0	— — —	— — —	0.50 1.35 1.80	— — —	0.50 1.35 1.80	V	
Low - Level Output Voltage	V _{OL}	V _{IN} = V _{IL}		I _{OL} = 20 μA	2.0	—	0.0	0.1	—	0.1
					4.5	—	0.0	0.1	—	0.1
				I _{OL} = 4 mA	4.5	—	0.17	0.26	—	0.33
				I _{OL} = 5.2 mA	6.0	—	0.18	0.26	—	0.33
Output Off - State Current	I _{oz}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC}	6.0	—	—	± 0.5	—	± 5.0	μA	
Input Leakage Current	I _{IN}	V _{IN} = V _{CC} or GND	6.0	—	—	± 0.1	—	± 1.0		
Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND	6.0	—	—	1.0	—	10.0		

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AC ELECTRICAL CHARACTERISTICS ($C_L = 15\text{pF}$, $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$, Input $t_r = t_f = 6\text{ns}$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Transition Time	t_{THL}		—	4	8	ns
Propagation Delay Time	t_{pLZ}	$R_L = 1\text{k}\Omega$	—	5	15	
Propagation Delay Time	t_{pZL}	$R_L = 1\text{k}\Omega$	—	5	15	

AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

PARAMETER	SYMBOL	TEST CONDITION	$T_a = 25^\circ\text{C}$			$T_a = -40\sim-85^\circ\text{C}$		UNIT	
			$V_{CC}(\text{V})$	MIN.	TYP.	MAX.	MIN.		MAX.
Output Transition Time	t_{THL}		2.0	—	30	75	—	95	ns
			4.5	—	8	15	—	19	
			6.0	—	7	13	—	16	
Propagation Delay Time	t_{pLZ}	$R_L = 1\text{k}\Omega$	2.0	—	10	90	—	115	
			4.5	—	7	18	—	23	
			6.0	—	6	15	—	20	
Propagation Delay Time	t_{pZL}	$R_L = 1\text{k}\Omega$	2.0	—	17	90	—	115	
			4.5	—	7	18	—	23	
			6.0	—	5	15	—	20	
Input Capacitance	C_{IN}		—	5	10	—	10	pF	
Output Capacitance	C_{OUT}		—	3	—	—	—		
Power Dissipation Capacitance	$C_{PD} (1)$		—	4	—	—	—		

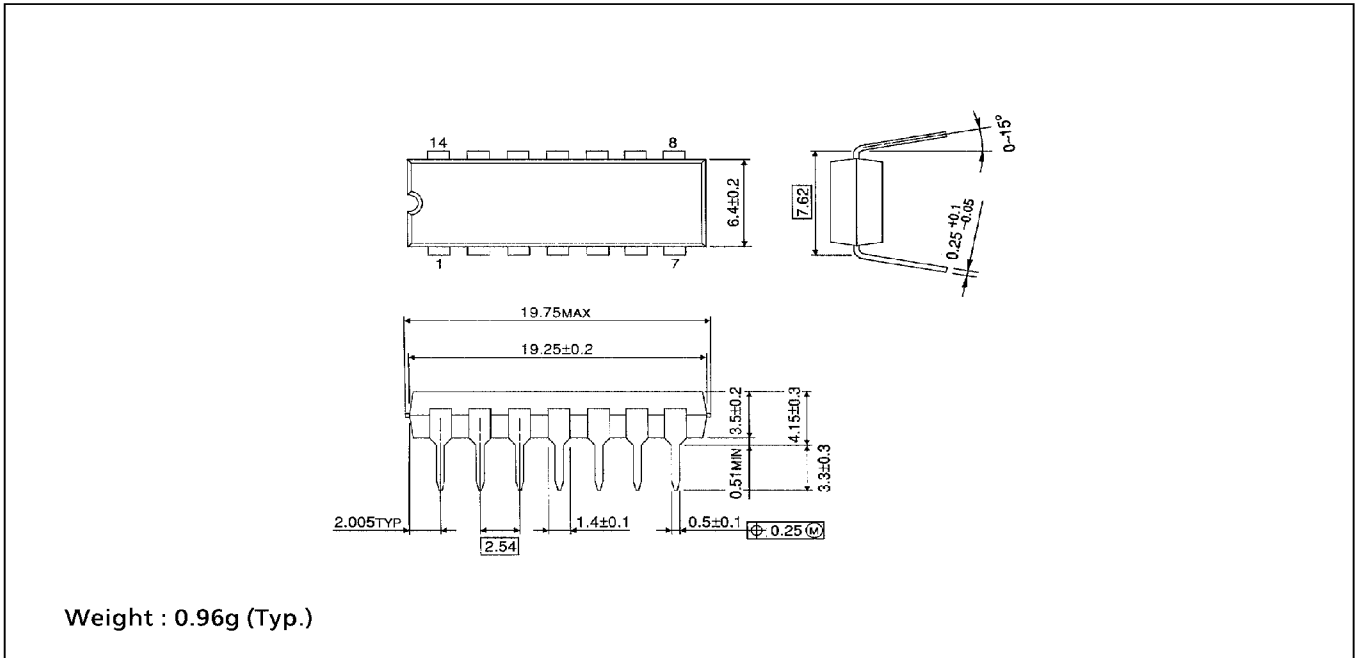
Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/6 \text{ (per Gate)}$$

DIP 14PIN OUTLINE DRAWING (DIP14-P-300-2.54)

Unit in mm



SOP 14PIN (200mil BODY) OUTLINE DRAWING (SOP14-P-300-1.27)

Unit in mm

