

# TC74HCT08AP, TC74HCT08AF, TC74HCT08AFN

## QUAD 2-INPUT AND GATE

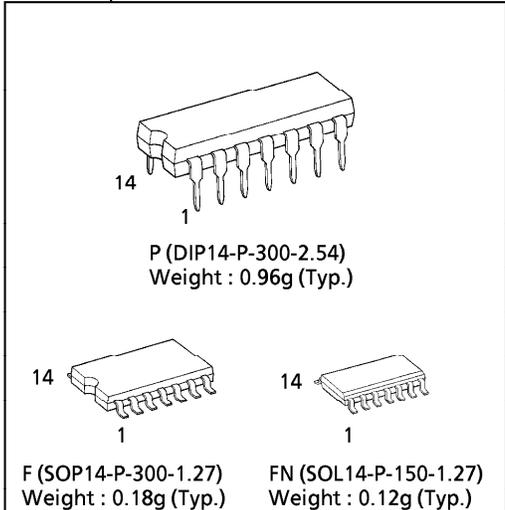
The TC74HCT08A is a high speed CMOS 2-INPUT AND GATE fabricated with silicon gate C<sup>2</sup>MOS technology. It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation. This device may be used as a level converter for interfacing TTL or NMOS to High Speed CMOS. The inputs are compatible with TTL, NMOS and CMOS output voltage levels.

The internal circuit is composed of 4-stages including buffer output, which provide high noise immunity and stable output. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

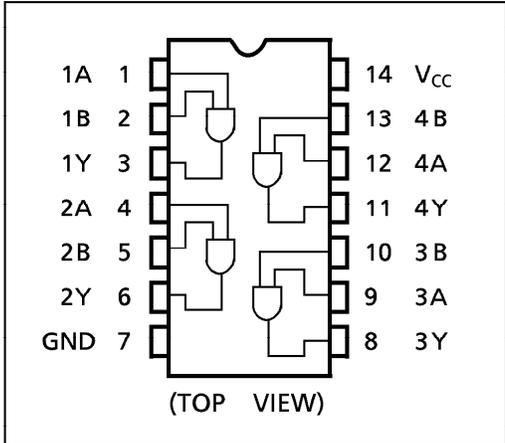
### FEATURES :

- High Speed..... $t_{pd} = 10\text{ns}(\text{typ.})$  at  $V_{CC} = 5\text{V}$
- Low Power Dissipation..... $I_{CC} = 1\mu\text{A}(\text{Max.})$  at  $T_a = 25^\circ\text{C}$
- Compatible with TTL outputs..... $V_{IH} = 2\text{V}(\text{Min.})$   
 $V_{IL} = 0.8\text{V}(\text{Max.})$
- Wide interfacing ability..... LSTTL,NMOS,CMOS
- Output Drive Capability..... 10 LSTTL Loads
- Symmetrical Output Impedance...  $|I_{OH}| = I_{OL} = 4\text{mA}(\text{Min.})$
- Balanced Propagation Delays.....  $t_{pLH} \approx t_{pHL}$
- Pin and Function Compatible with 74LS08

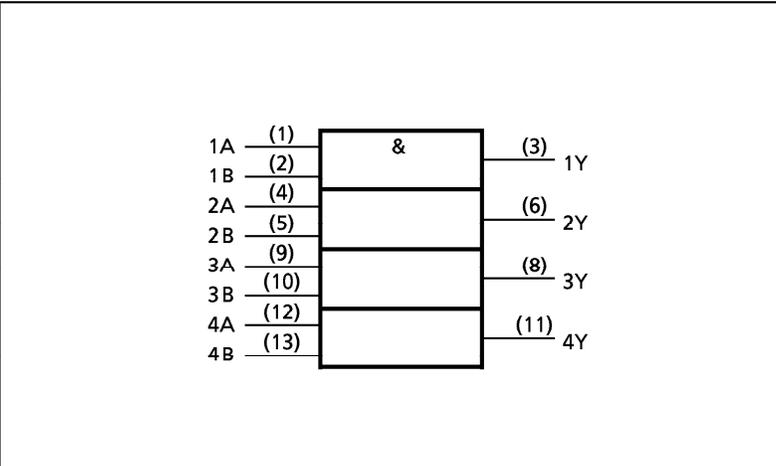
(Note) The JEDEC SOP (FN) is not available in Japan.



### PIN ASSIGNMENT



### IEC LOGIC SYMBOL



### TRUTH TABLE

A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

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## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	$V_{CC}$	$-0.5 \sim 7$	V
DC Input Voltage	$V_{IN}$	$-0.5 \sim V_{CC} + 0.5$	V
DC Output Voltage	$V_{OUT}$	$-0.5 \sim V_{CC} + 0.5$	V
Input Diode Current	$I_{IK}$	$\pm 20$	mA
Output Diode Current	$I_{OK}$	$\pm 20$	mA
DC Output Current	$I_{OUT}$	$\pm 25$	mA
DC $V_{CC}$ / Ground Current	$I_{CC}$	$\pm 50$	mA
Power Dissipation	$P_D$	500 (DIP)* / 180 (SOP)	mW
Storage Temperature	$T_{stg}$	$-65 \sim 150$	$^{\circ}\text{C}$

\*500mW in the range of  $T_a = -40^{\circ}\text{C} \sim 65^{\circ}\text{C}$ . From  $T_a = 65^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  a derating factor of  $-10\text{mW}/^{\circ}\text{C}$  shall be applied until 300mW

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{CC}$	4.5~5.5	V
Input Voltage	$V_{IN}$	$0 \sim V_{CC}$	V
Output Voltage	$V_{OUT}$	$0 \sim V_{CC}$	V
Operating Temperature	$T_{opr}$	$-40 \sim 85$	$^{\circ}\text{C}$
Input Rise and Fall Time	$t_r, t_f$	0~500	ns

## DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	$V_{CC}$ (V)	$T_a = 25^{\circ}\text{C}$			$T_a = -40 \sim 85^{\circ}\text{C}$		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.		
High - Level Input Voltage	$V_{IH}$		4.5 § 5.5	2.0	—	—	2.0	—	V	
Low - Level Input Voltage	$V_{IL}$		4.5 § 5.5	—	—	0.8	—	0.8	V	
High - Level Output Voltage	$V_{OH}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OH} = -20 \mu\text{A}$	4.5	4.4	4.5	—	4.4	—	V
			$I_{OH} = -4 \text{ mA}$	4.5	4.18	4.31	—	4.13	—	
Low - Level Output Voltage	$V_{OL}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OL} = 20 \mu\text{A}$	4.5	—	0.0	0.1	—	0.1	V
			$I_{OL} = 4 \text{ mA}$	4.5	—	0.17	0.26	—	0.33	
Input Leakage Current	$I_{IN}$	$V_{IN} = V_{CC}$ or GND	5.5	—	—	$\pm 0.1$	—	$\pm 1.0$	$\mu\text{A}$	
Quiescent Supply Current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND	5.5	—	—	1.0	—	10.0	mA	
	$I_C$	PER INPUT: $V_{IN} = 0.5\text{V}$ or $2.4\text{V}$ OTHER INPUT: $V_{CC}$ or GND	5.5	—	—	2.0	—	2.9		

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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	$t_{TLH}$		—	6	12	ns
	$t_{THL}$					
Propagation Delay Time	$t_{pLH}$		—	10	16	
	$t_{pHL}$					

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	
			$V_{CC}$ (V)	MIN.	TYP.	MAX.	MIN.		MAX.
Output Transition Time	$t_{TLH}$		4.5	—	8	15	—	19	ns
	$t_{THL}$		5.5	—	7	13	—	16	
Propagation Delay Time	$t_{pLH}$		4.5	—	13	20	—	25	
	$t_{pHL}$		5.5	—	11	18	—	23	
Input Capacitance	$C_{IN}$		—	5	10	—	10	pF	
Power Dissipation Capacitance	$C_{PD}$ (1)		—	24	—	—	—		

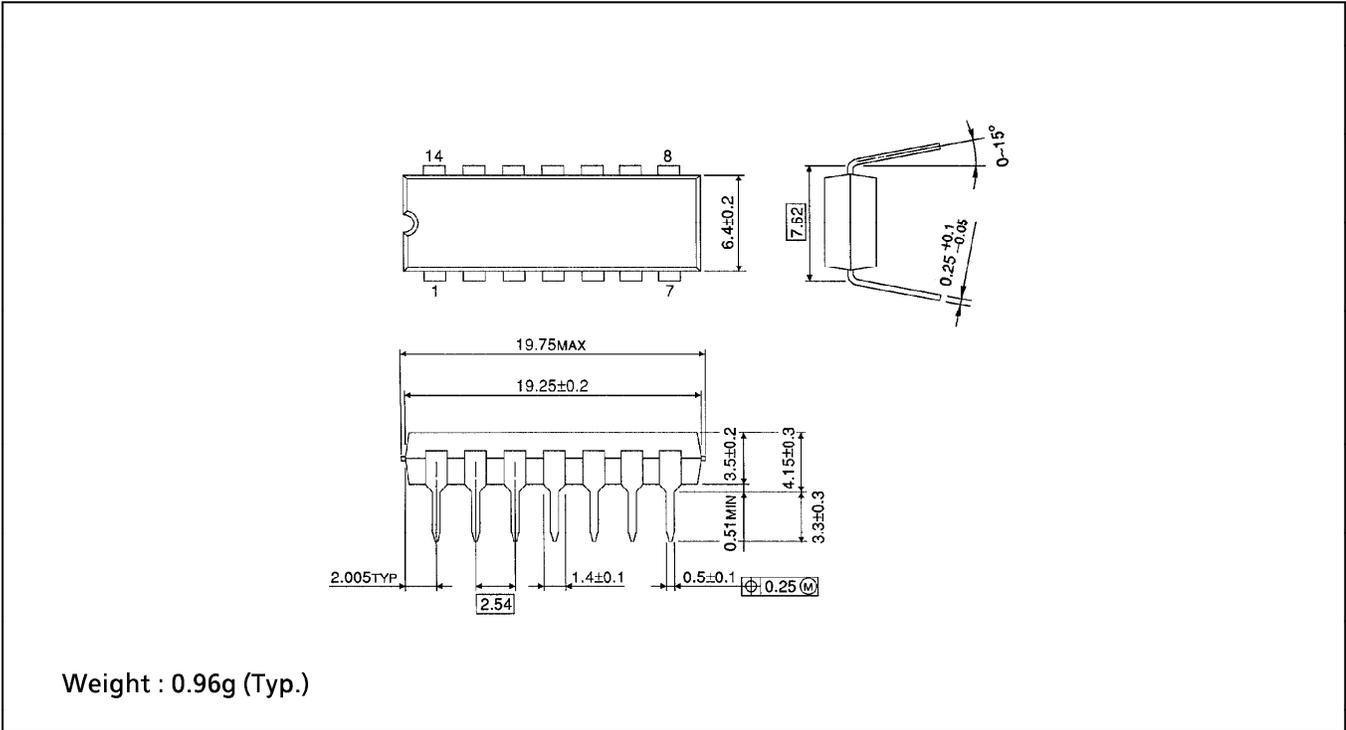
Note (1)  $C_{PD}$  is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/4 \text{ (per Gate)}$$

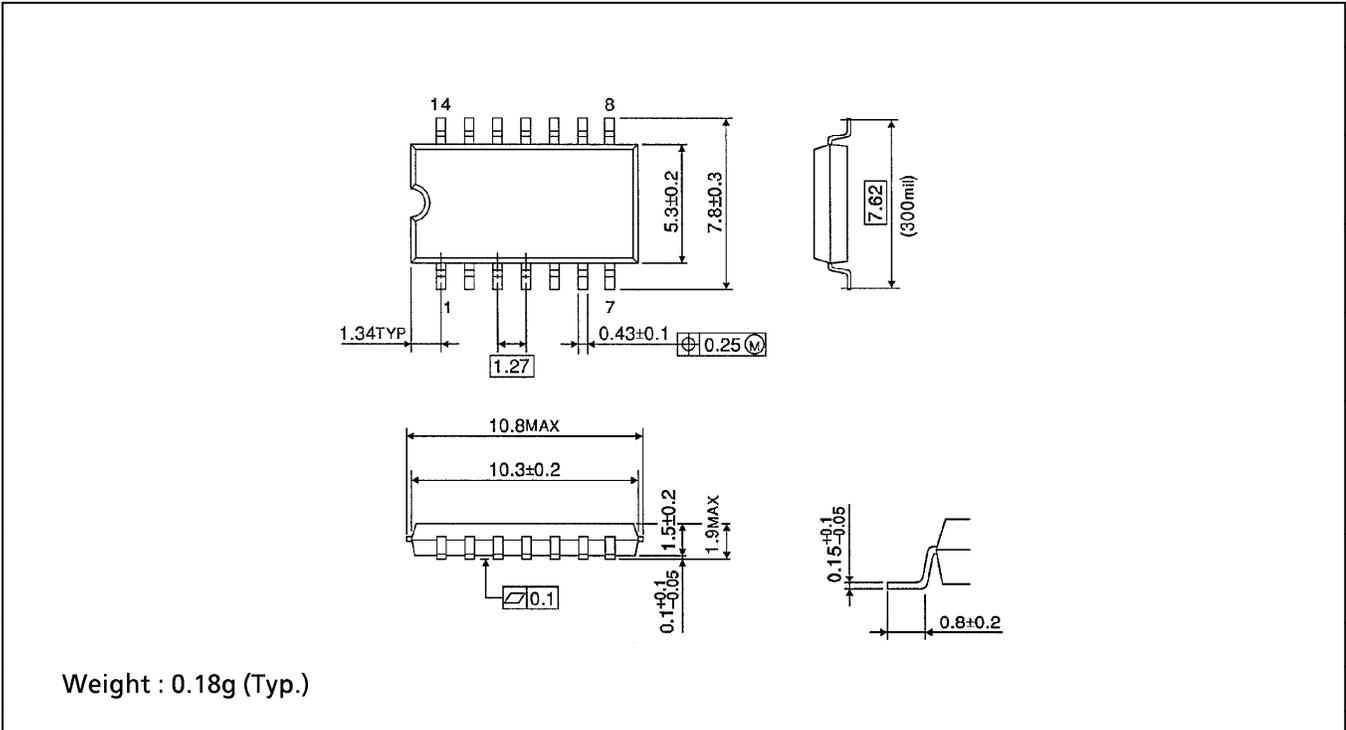
**DIP 14PIN OUTLINE DRAWING (DIP14-P-300-2.54)**

Unit in mm



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

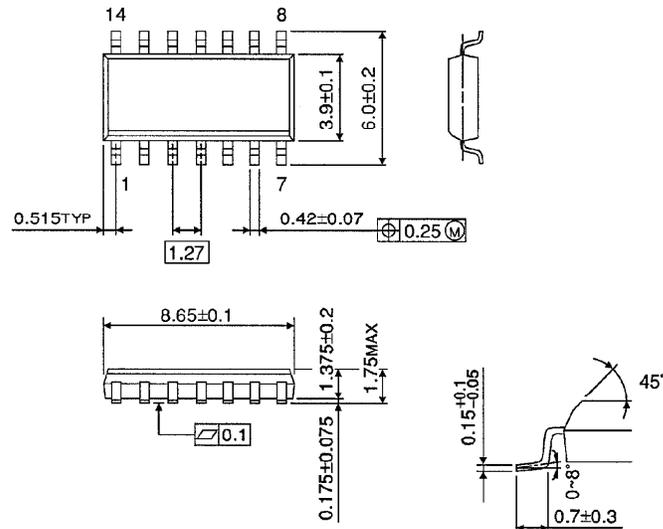
Unit in mm



**SOP 14PIN (150mil BODY) OUTLINE DRAWING (SOL14-P-150 -1.27)**

Unit in mm

(Note) This package is not available in Japan.



Weight : 0.12g (Typ.)