

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TC74HC125AP, TC74HC125AF, TC74HC125AFN**  
**TC74HC126AP, TC74HC126AF**

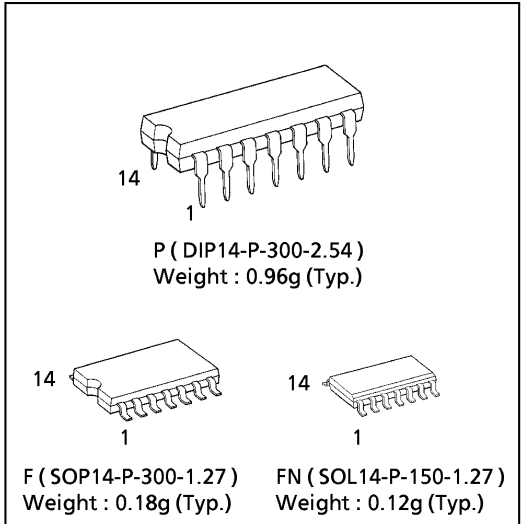
**TC74HC125AP/AF/AFN QUAD BUS BUFFER**  
**TC74HC126AP/AF QUAD BUS BUFFER**

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

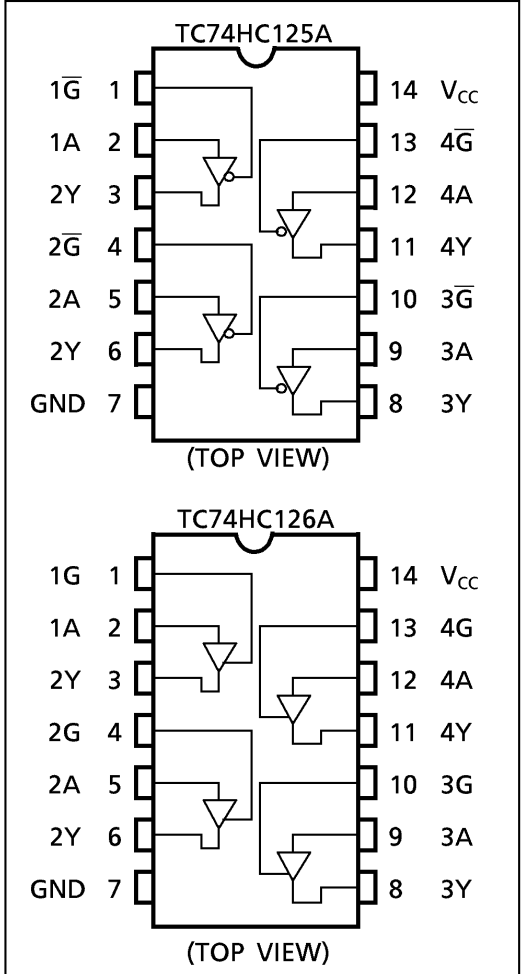
The TC74HC125A/126A are high speed CMOS QUAD BUS BUFFERS fabricated with silicon gate C<sup>2</sup>MOS technology. They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation. The TC74HC125A requires the 3-state control input  $\overline{G}$  to be set high to place the output into the high impedance state, whereas the TC74HC126A requires the control input to be set low to place the output into high impedance. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

**FEATURES :**

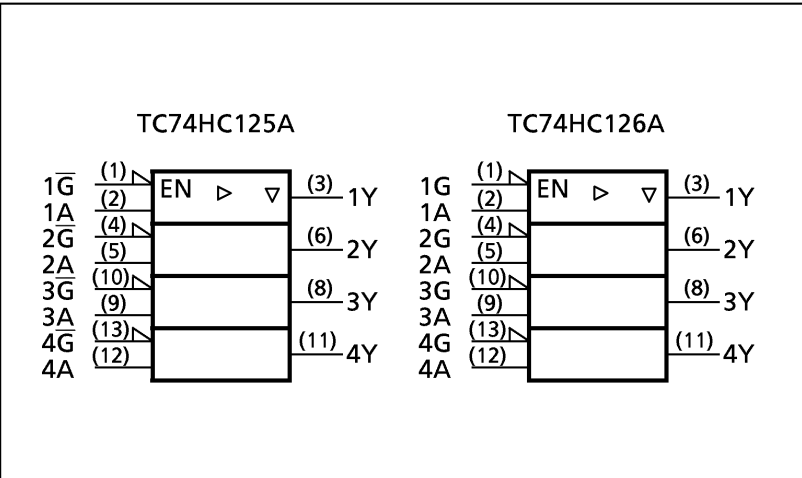
- High Speed..... $t_{pd} = 10\text{ns}(\text{typ.})$  at  $V_{CC} = 5\text{V}$
- Low Power Dissipation..... $I_{CC} = 4\mu\text{A}(\text{Max.})$  at  $T_a = 25^\circ\text{C}$
- High Noise Immunity..... $V_{NIH} = V_{NIL} = 28\% V_{CC}$  (Min.)
- Output Drive Capability..... 15 LSTTL Loads
- Symmetrical Output Impedance...  $|I_{OH}| = I_{OL} = 6\text{mA}(\text{Min.})$
- Balanced Propagation Delays.....  $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range...  $V_{CC}(\text{opr.}) = 2\text{V} \sim 6\text{V}$
- Pin and Function Compatible with 74LS125/126



**PIN ASSIGNMENT**



**IEC LOGIC SYMBOL**



## TRUTH TABLE

TC74HC125A

INPUTS		OUTPUTS
$\bar{G}$	A	Y
H	X	Z
L	L	L
L	H	H

X: Don't Care  
Z: High Impedance

TC74HC126A

INPUTS		OUTPUTS
G	A	Y
L	X	Z
H	L	L
H	H	H

X: Don't Care  
Z: High Impedance

## 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	$I_{IK}$	$\pm 20$	mA
Output Diode Current	$I_{OK}$	$\pm 20$	mA
DC Output Current	$I_{OUT}$	$\pm 35$	mA
DC $V_{CC}$ / Ground Current	$I_{CC}$	$\pm 75$	mA
Power Dissipation	$P_D$	500 (DIP)* / 180 (SOP)	mW
Storage Temperature	$T_{stg}$	-65~150	°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	$V_{CC}$	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 ( $V_{CC} = 2.0\text{V}$ ) 0~500 ( $V_{CC} = 4.5\text{V}$ ) 0~400 ( $V_{CC} = 6.0\text{V}$ )	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	$V_{IH}$		2.0	1.50	—	—	1.50	—	V	
			4.5	3.15	—	—	3.15	—		
			6.0	4.20	—	—	4.20	—		
Low - Level Input Voltage	$V_{IL}$		2.0	—	—	0.50	—	0.50	V	
			4.5	—	—	1.35	—	1.35		
			6.0	—	—	1.80	—	1.80		
High - Level Output Voltage	$V_{OH}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OH} = -20\mu\text{A}$	2.0	1.9	2.0	—	1.9	—	V
				4.5	4.4	4.5	—	4.4	—	
				6.0	5.9	6.0	—	5.9	—	
Low - Level Output Voltage	$V_{OL}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OH} = -6\text{ mA}$ $I_{OH} = -7.8\text{mA}$	4.5	4.18	4.31	—	4.13	—	V
				6.0	5.68	5.80	—	5.63	—	
				2.0	—	0.0	0.1	—	0.1	
4.5	—	0.0	0.1	—	0.1					
6.0	—	0.0	0.1	—	0.1					
3 - State Output Off - State Current	$I_{OZ}$	$V_{IN} = V_{IH}$ or $V_{IL}$ $V_{OUT} = V_{CC}$ or GND	6.0	—	—	$\pm 0.5$	—	$\pm 5.0$	$\mu\text{A}$	
			Input Leakage Current	$I_{IN}$	$V_{IN} = V_{CC}$ or GND	6.0	—	—		$\pm 0.1$
Quiescent Supply Current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND	6.0	—	—	4.0	—	40.0		

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

PARAMETER	SYMBOL	TEST CONDITION	TEST CONDITION		Ta = 25°C			Ta = -40-85°C		UNIT
			CL (pF)	V <sub>CC</sub> (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	$t_{TLH}$ $t_{THL}$		50	2.0	—	20	60	—	75	ns
				4.5	—	6	12	—	15	
				6.0	—	5	10	—	13	
Propagation Delay Time	$t_{pLH}$ $t_{pHL}$		50	2.0	—	30	90	—	115	
				4.5	—	11	18	—	23	
				6.0	—	10	15	—	20	
			150	2.0	—	42	130	—	165	
				4.5	—	14	26	—	33	
				6.0	—	12	22	—	28	
Output Enable time	$t_{pZL}$ $t_{pZH}$	$R_L = 1\text{k}\Omega$	50	2.0	—	30	90	—	115	
				4.5	—	11	18	—	23	
				6.0	—	10	15	—	20	
			150	2.0	—	42	130	—	165	
				4.5	—	14	26	—	33	
				6.0	—	12	22	—	28	
Output Disable time	$t_{pLZ}$ $t_{pHZ}$	$R_L = 1\text{k}\Omega$	50	2.0	—	24	100	—	125	
				4.5	—	12	20	—	25	
				6.0	—	10	17	—	21	
Input Capacitance	$C_{IN}$				—	5	10	—	10	pF
Output Capacitance	$C_{OUT}$				—	10	—	—	—	
Power Dissipation Capacitance	$C_{PD} (1)$				—	41	—	—	—	

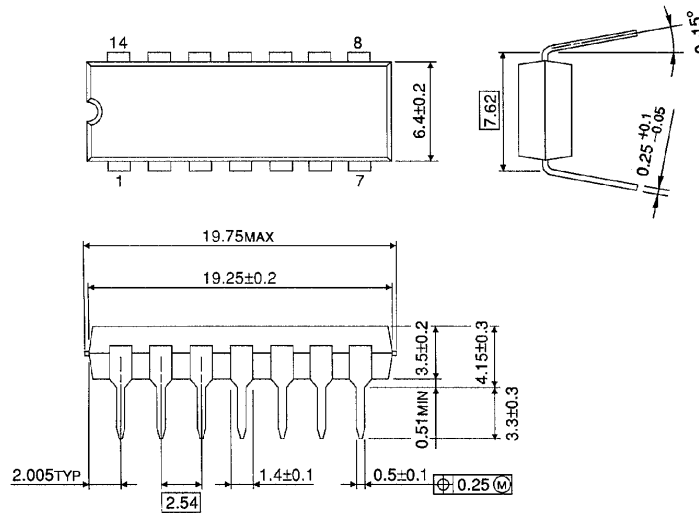
Note (1)  $C_{PD}$  is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

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 PACKAGE DIMENSIONS ( DIP14-P-300-2.54 )**

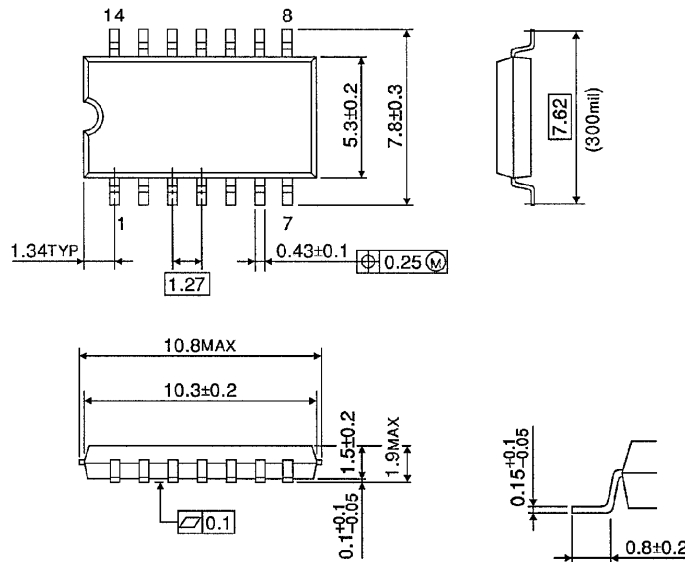
Unit in mm



Weight : 0.96g (Typ.)

**SOP 14PIN ( 200mil BODY ) PACKAGE DIMENSIONS ( SOP14-P-300-1.27 )**

Unit in mm

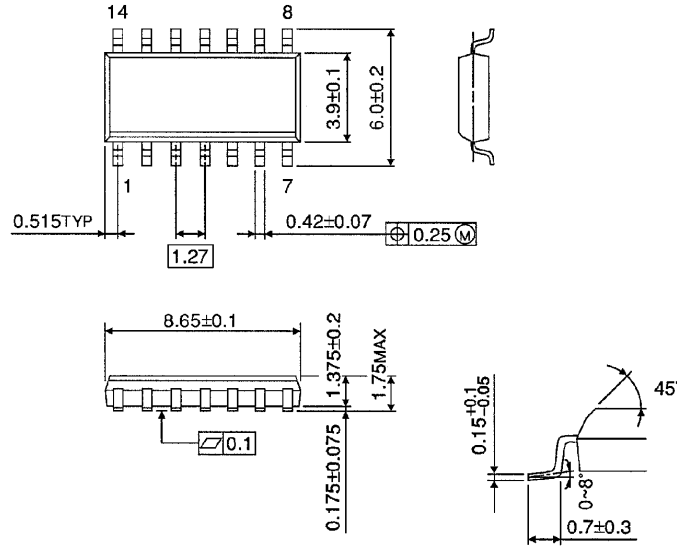


Weight : 0.18g (Typ.)

**SOP 14PIN ( 150mil BODY ) PACKAGE DIMENSIONS ( SOL14-P-150 -1.27)**

Unit in mm

(Note) This package is not available in Japan.



Weight : 0.12g (Typ.)

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