TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HC125AP, TC74HC125AF, TC74HC125AFN
TC74HC126AP, TC74HC126AF

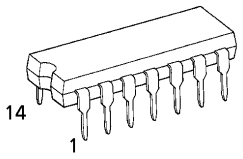
TC74HC125AP/AF/AFN QUAD BUS BUFFER
TC74HC126AP/AF QUAD BUS BUFFER

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

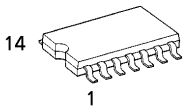
The TC74HC125A/126A are high speed CMOS QUAD BUS BUFFERs fabricated with silicon gate C²MOS technology.
They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.
The TC74HC125A requires the 3-state control input $\overline{G}$ to be set high to 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 :

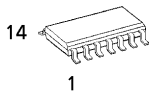
- High Speed ····· t_{pd} = 10ns(typ.) at V_{CC} = 5V
- Low Power Dissipation ····· I_{CC} = 4μA(Max.) at Ta = 25°C
- High Noise Immunity ····· $V_{NIH} = V_{NIL}$ = 28% V_{CC} (Min.)
- Output Drive Capability ····· 15 LSTTL Loads
- Symmetrical Output Impedance ··· $|I_{OH}| = I_{OL}$ = 6mA(Min.)
- Balanced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



P (DIP14-P-300-2.54)
Weight : 0.96g (Typ.)

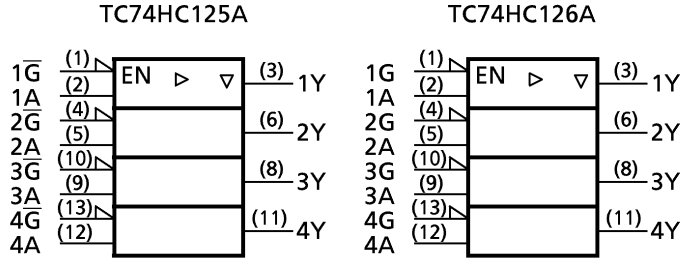


F (SOP14-P-300-1.27)
Weight : 0.18g (Typ.)

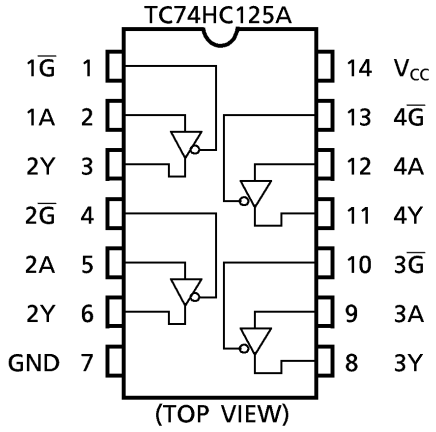


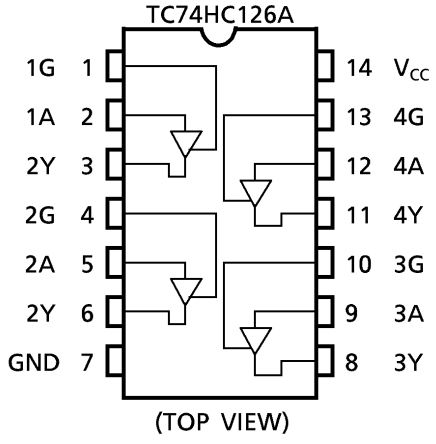
FN (SOL14-P-150-1.27)
Weight : 0.12g (Typ.)

IEC LOGIC SYMBOL



PIN ASSIGNMENT





TRUTH TABLE

TC74HC125A

INPUTS		OUTPUTS
$\overline{G}$	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}	±20	mA
Output Diode Current	I_{OK}	±20	mA
DC Output Current	I_{OUT}	±35	mA
DC V_{CC} / Ground Current	I_{CC}	±75	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 MIN.	Ta = 25°C TYP.	Ta = 25°C MAX.	Ta = −40~85°C MIN.	Ta = −40~85°C MAX.	UNIT
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
High - Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = −20μA	2.0 4.5 6.0	1.9 4.4 5.9	2.0 4.5 6.0	— — —	1.9 4.4 5.9	— — —	V
			I_{OH} = −6 mA I_{OH} = −7.8mA	4.5 6.0	4.18 5.68	4.31 5.80	— —	4.13 5.63	— —	
Low - Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20μA	2.0 4.5 6.0	— — —	0.0 0.0 0.0	0.1 0.1 0.1	— — —	0.1 0.1 0.1	V
			I_{OL} = 6 mA I_{OL} = 7.8mA	4.5 6.0	— —	0.17 0.18	0.26 0.26	— —	0.33 0.33	
3 - State Output Off - State Current	I_{OZ}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = V_{CC} or GND		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	—	—	4.0	—	40.0	

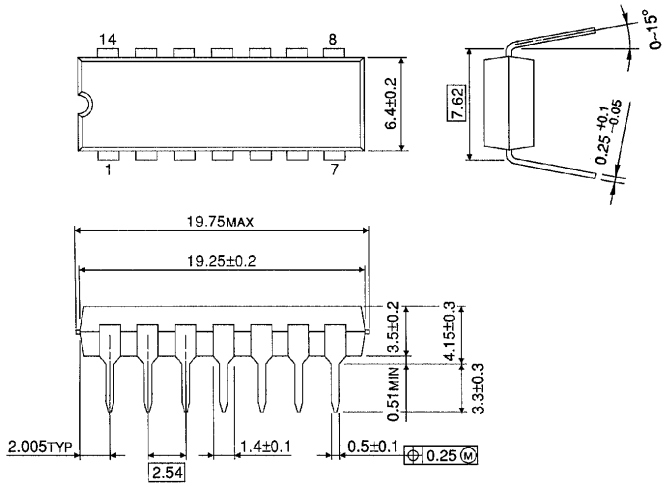
AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 6ns$)

PARAMETER	SYMBOL	TEST CONDITION			Ta = 25°C			Ta = −40~85°C		UNIT
			CL (pF)	V_{CC} (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}	$R_L = 1k\Omega$	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}	$R_L = 1k\Omega$	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 :

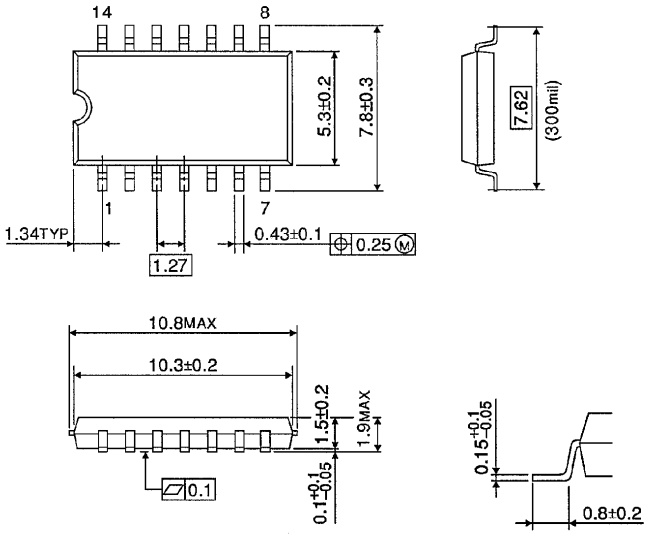
$$I_{CC}(opr) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 4 \text{ (per Gate)}$$

DIP 14PIN PACKAGE DIMENSIONS (DIP14-P-300-2.54) Unit in mm



Weight : 0.96g (Typ.)

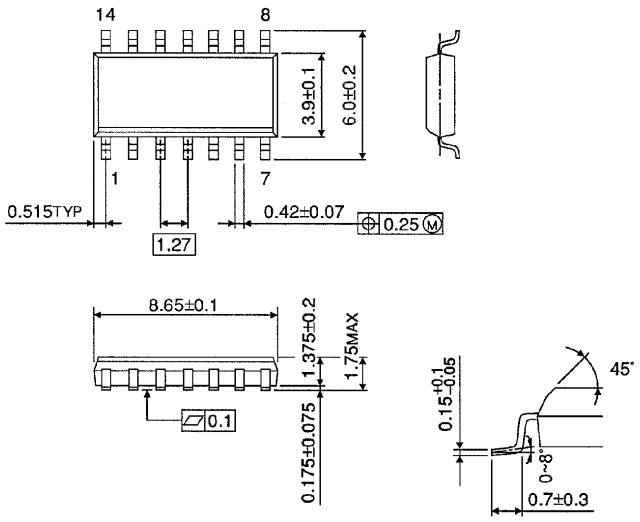
SOP 14PIN (200mil BODY) PACKAGE DIMENSIONS (SOP14-P-300-1.27) Unit in mm



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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