TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HC367AP, TC74HC367AF, TC74HC367AFN
TC74HC368AP, TC74HC368AF, TC74HC368AFN

HEX BUS BUFFER
TC74HC367AP / AF / AFN NON – INVERTED (3-STATE)
TC74HC368AP / AF / AFN INVERTED (3-STATE)

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

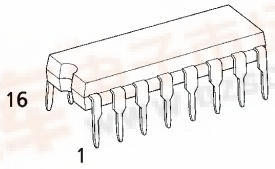
The TC74HC367A and TC74HC368A are high speed CMOS 3 - STATE BUS BUFFERs fabricated with silicon gate C^2MOS technology.

They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

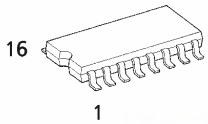
They contain six buffers; four buffers are controlled by an enable input ($\overline{G}1$), and the other two buffers are controlled by another enable input ($\overline{G}2$). The outputs of each buffer group are enabled when $\overline{G}1$ and / or $\overline{G}2$ inputs are held low; if held high, these outputs are in a high impedance state.

The TC74HC367A is a non - inverting output type, while the TC74HC368A is an inverting output type.

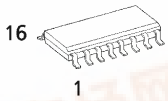
All inputs are equipped with protection circuits against static discharge or transient excess voltage.



P (DIP16-P-300-2.54A)
Weight : 1.00g (Typ.)



F (SOP16-P-300-1.27)
Weight : 0.18g (Typ.)



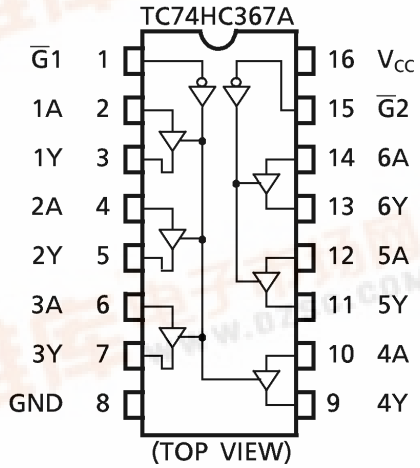
FN (SOL16-P-150-1.27)
Weight : 0.13g (Typ.)

FEATURES :

- High Speed ····· t_{pd} = 11ns(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
- Balanced Propagation Delays ····· $t_{pLH} \simeq t_{pHL}$
- Wide Operating Voltage Range ···· V_{CC} (opr.) = 2V ~ 6V
- Pin and Function Compatible with 74LS367/368

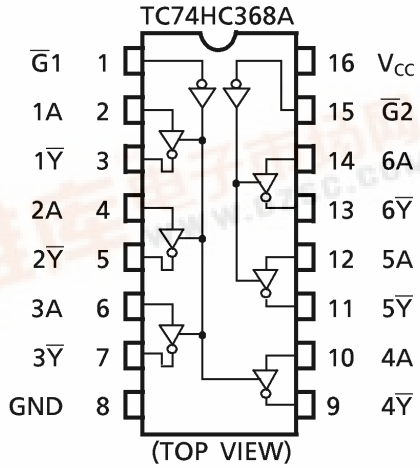
PIN ASSIGNMENT

TC74HC367A



(TOP VIEW)

TC74HC368A



(TOP VIEW)

TRUTH TABLE

INPUTS		OUTPUTS	
$\overline{G}$	An	Y(367A)	$\overline{Y}$(368A)
L	L	L	H
L	H	H	L
H	X	Z	Z

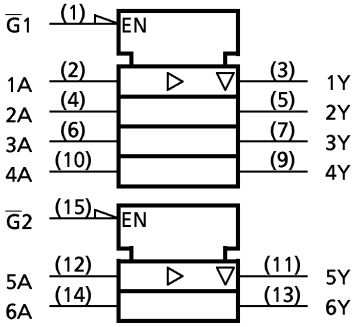
X : Don't Care, Z : High Impedance

961001EBA2

IEC LOGIC SYMBOL

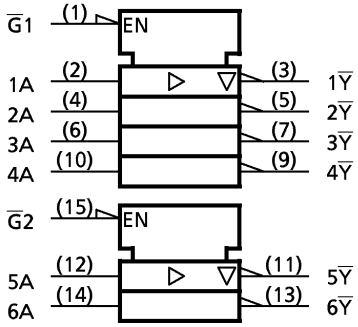
TC74HC367A

HEX BUS BUFFER
(3 - STATE)



TC74HC368A

HEX BUS BUFFER
(3 - STATE / INV.)



961001EBA2'

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	

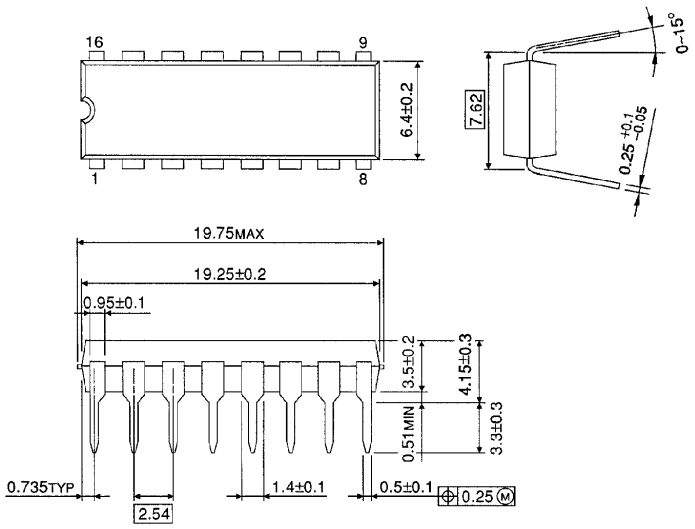
AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 6ns$)

PARAMETER	SYMBOL	TEST CONDITION	CL	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
Output Transition Time	t_{TLH} t_{THL}		50	2.0	−	25	60	−	75	ns
				4.5	−	7	12	−	15	
				6.0	−	6	10	−	13	
Propagation Delay Time	t_{pLH} t_{pHL}		50	2.0	−	36	95	−	120	
				4.5	−	12	19	−	24	
				6.0	−	10	16	−	20	
			150	2.0	−	40	130	−	165	
				4.5	−	16	26	−	33	
				6.0	−	14	22	−	28	
Output Enable Time	t_{pZL} t_{pZH}	$R_L = 1k\Omega$	50	2.0	−	36	120	−	150	
				4.5	−	12	24	−	30	
				6.0	−	10	20	−	26	
			150	2.0	−	40	160	−	200	
				4.5	−	16	32	−	40	
				6.0	−	14	27	−	34	
Output Disable Time	t_{pLZ} t_{pHZ}	$R_L = 1k\Omega$	50	2.0	−	35	120	−	150	
				4.5	−	15	24	−	30	
				6.0	−	13	20	−	26	
Input Capacitance	C_{IN}				−	5	10	−	10	pF
Output Capacitance	C_{OUT}				−	10	−	−	−	
Power Dissipation Capacitance	C_{PD} (1)	TC74HC367A			−	36	−	−	−	
		TC74HC368A			−	30	−	−	−	

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 :

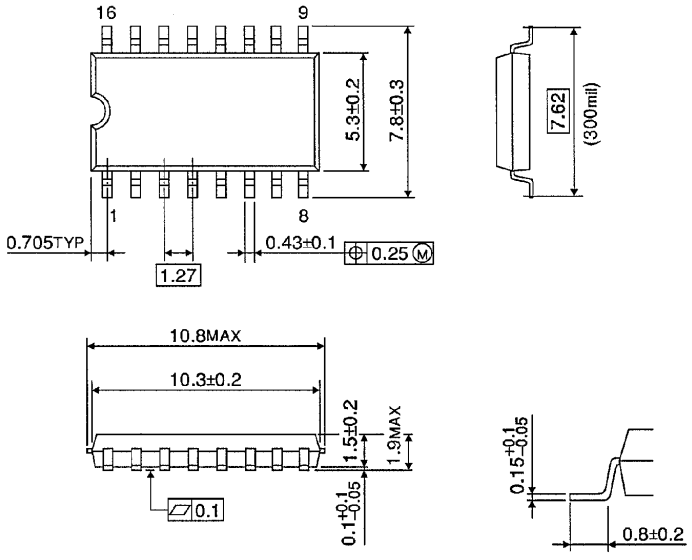
$$I_{CC}(opr) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 6 \text{ (per bit)}$$

DIP 16PIN OUTLINE DRAWING (DIP16-P-300-2.54A) Unit in mm



Weight : 1.00g (Typ.)

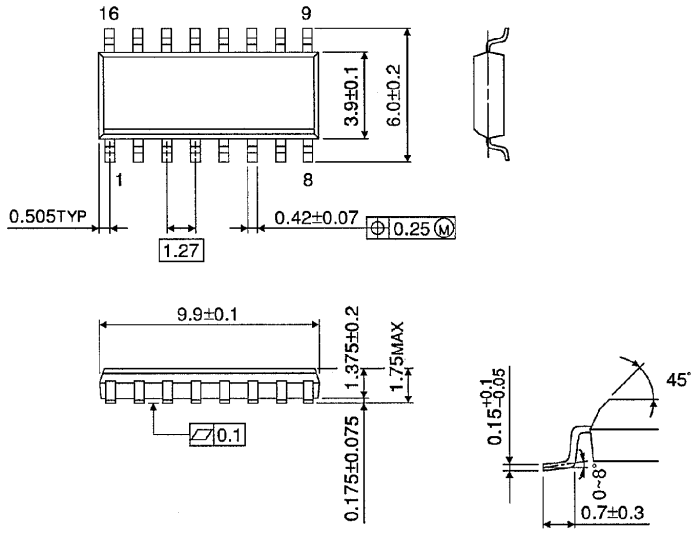
SOP 16PIN (200mil BODY) OUTLINE DRAWING (SOP16-P-300-1.27) Unit in mm



Weight : 0.18g (Typ.)

SOP 16PIN (150mil BODY) OUTLINE DRAWING (SOL16-P-150 -1.27) Unit in mm

(Note) This package is not available in Japan.



Weight : 0.13g (Typ.)