

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 C²MOS 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 ($\bar{G}1$), and the other two buffers are controlled by another enable input ($\bar{G}2$). The outputs of each buffer group are enabled when $\bar{G}1$ and/or $\bar{G}2$ 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.

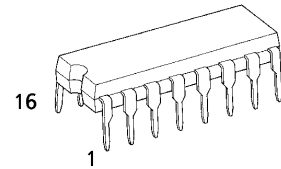
FEATURES :

- High Speed..... $t_{pd} = 11\text{ns}(\text{typ.})$ 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..... $V_{NIH} = V_{NIL} = 28\% V_{CC} (\text{Min.})$
- Output Drive Capability..... 15 LSTTL Loads
- Symmetrical Output Impedance... $|I_{OH}| = I_{OL} = 6\text{mA}$
- 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 74LS367/368

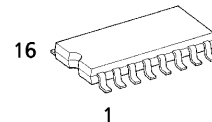
TRUTH TABLE

INPUTS		OUTPUTS	
\bar{G}	A_n	Y(367A)	\bar{Y} (368A)
L	L	L	H
L	H	H	L
H	X	Z	Z

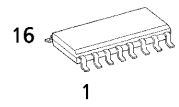
X : Don't Care, Z : High Impedance



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

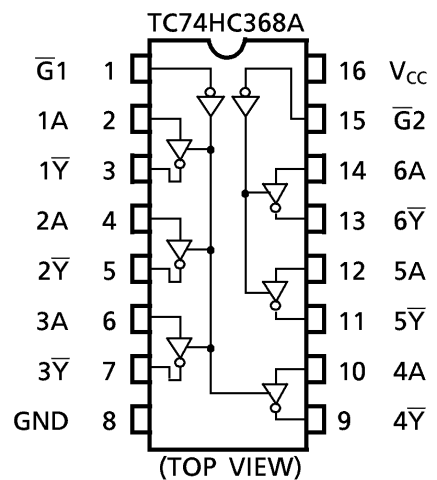
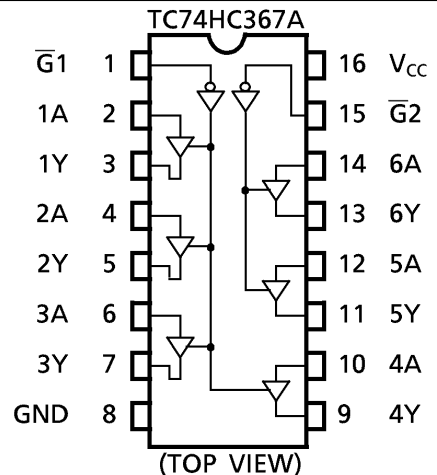


F (SOP16-P-300-1.27)
Weight : 0.18g (Typ.)

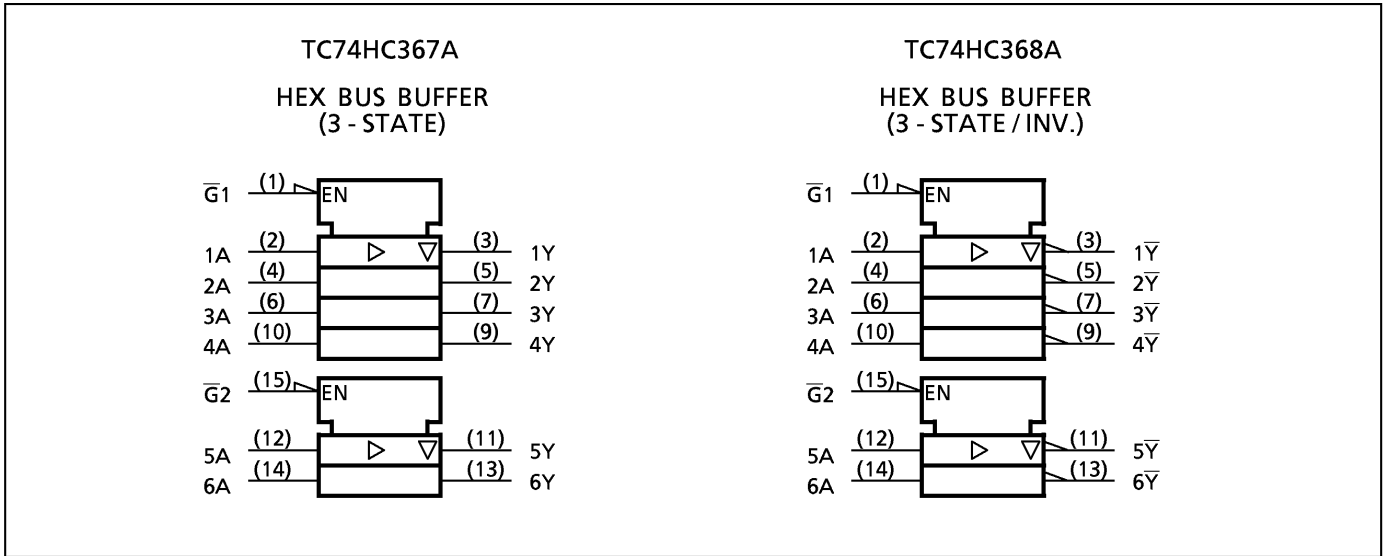


FN (SOL16-P-150-1.27)
Weight : 0.13g (Typ.)

PIN ASSIGNMENT



IEC LOGIC SYMBOL



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			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		
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	μA		
Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND	6.0	—	—	4.0	—	40.0	μA		

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

PARAMETER	SYMBOL	TEST CONDITION			Ta = 25°C			Ta = -40-85°C		UNIT
			CL	V _{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
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}	$R_L = 1\text{k}\Omega$	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}	$R_L = 1\text{k}\Omega$	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	—	—	—	

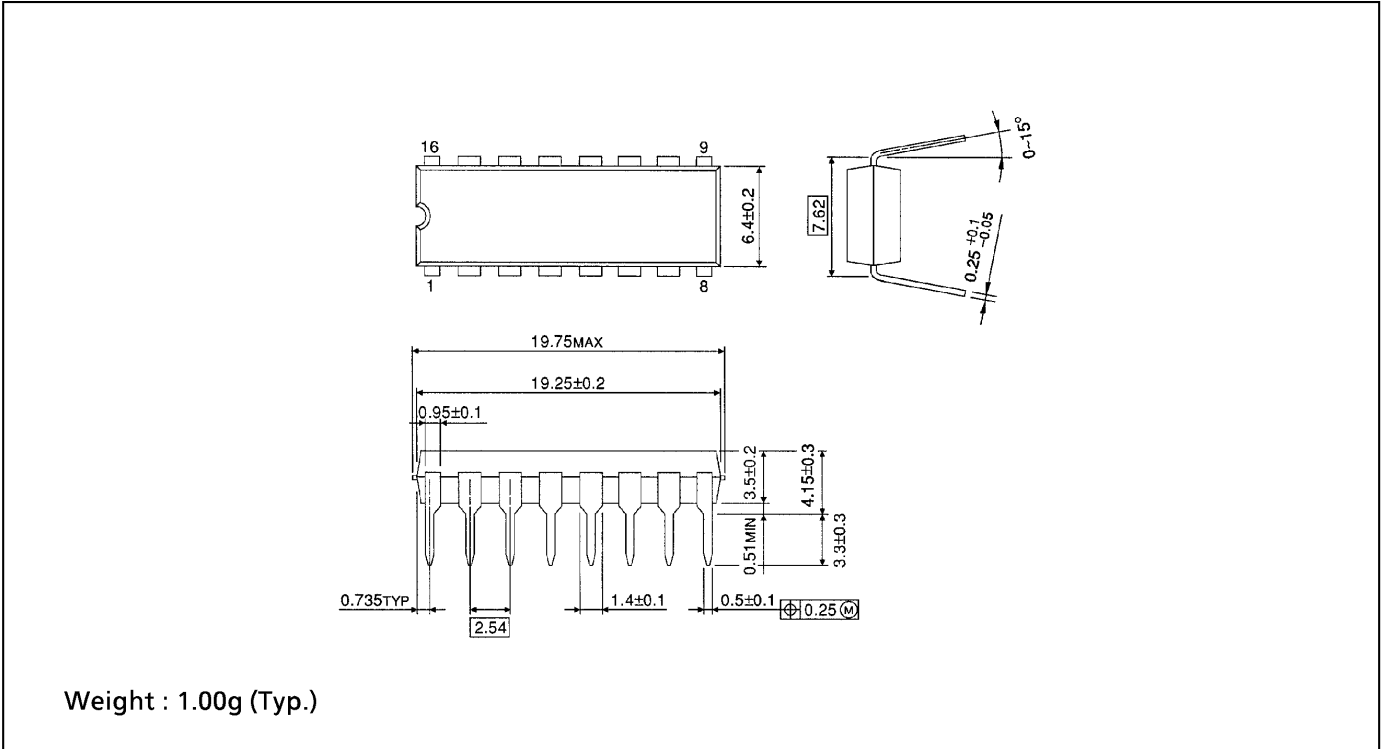
Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

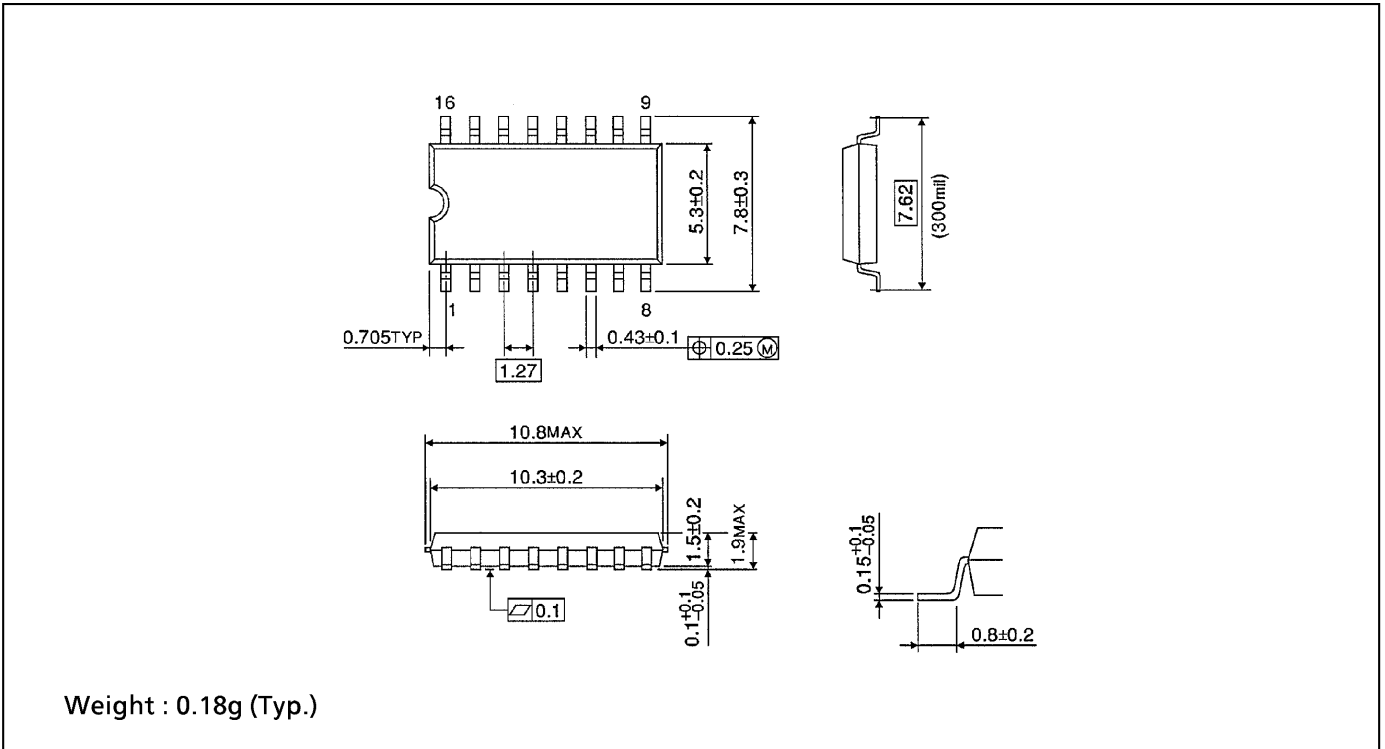
DIP 16PIN PACKAGE DIMENSIONS (DIP16-P-300-2.54A)

Unit in mm



SOP 16PIN (200mil BODY) PACKAGE DIMENSIONS (SOP16-P-300-1.27)

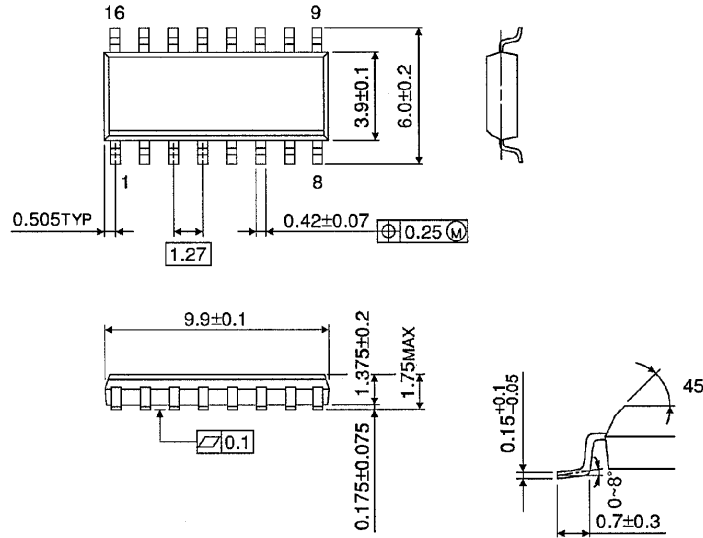
Unit in mm



SOP 16PIN (150mil BODY) PACKAGE DIMENSIONS (SOL16-P-150 -1.27)

Unit in mm

(Note) This package is not available in Japan.



Weight : 0.13g (Typ.)

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