TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74VHCT367AF, TC74VHCT367AFN, TC74VHCT367AFT

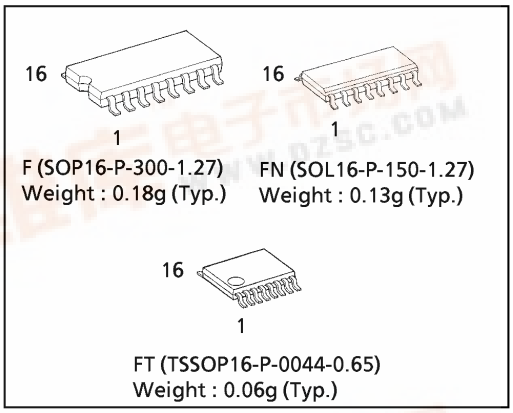
HEX BUS BUFFER
TC74VHCT367 AF / AFN / AFT NON - INVERTED, 3 - STATE OUTPUTS

The TC74VHCT367A is advanced high speed CMOS HEX BUS BUFFERs fabricated with silicon gate C²MOS technology.
They achieve the high speed operation similar to equivalent Bipolar Schottky TTL 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 TC74VHCT367A is a non - inverting output type.
Input protection and output circuit ensure that 0 to 5.5V can be applied to the input and output*1 pins without regard to the supply voltage. These structure prevents device destruction due to mismatched supply and input / output voltages such as battery back up, hot board insertion, etc.

*1: output in off-state

FEATURES :

- High Speed ····· t_{pd} = 5.5ns (typ.) at V_{CC} = 5V
- Low Power Dissipation ····· I_{CC} = 4μA (Max.) at Ta = 25°C
- Compatible with TTL outputs ··· V_{IL} = 0.8V (Max.)
  V_{IH} = 2.0V (Min.)
- Power Down Protection is provided on all inputs and outputs
- Balanced Propagation Delays ····· $t_{pLH} \simeq t_{pHL}$
- Low Noise ····· V_{OLP} = 0.8V (Max.)
- Pin and Function Compatible with the 74ALS367.

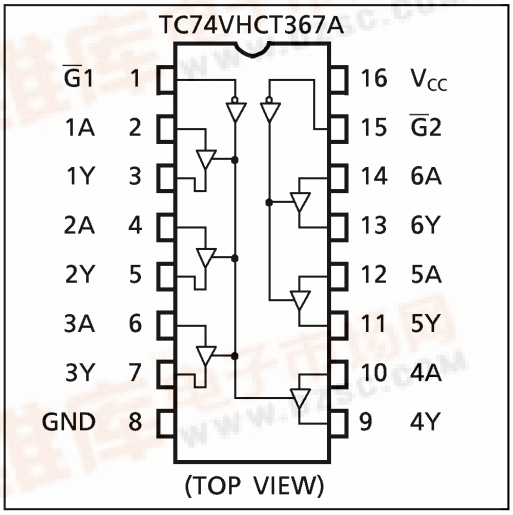


F (SOP16-P-300-1.27)
Weight : 0.18g (Typ.)

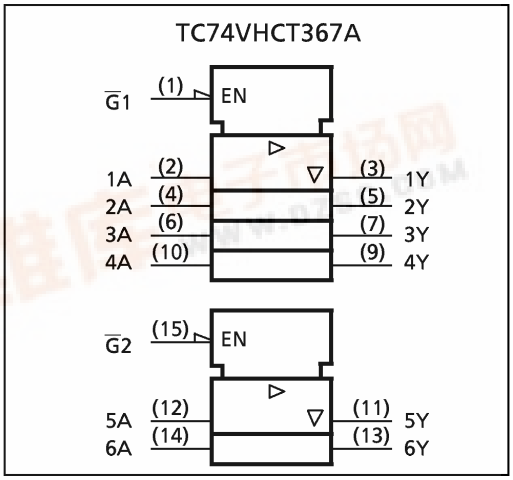
FN (SOL16-P-150-1.27)
Weight : 0.13g (Typ.)

FT (TSSOP16-P-0044-0.65)
Weight : 0.06g (Typ.)

PIN ASSIGNMENT



IEC LOGIC SYMBOL



TRUTH TABLE

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

X : Don't Care
Z : High Impedance

961001EBA2

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	−0.5~7.0	V
DC Input Voltage	V_{IN}	−0.5~7.0	V
DC Output Voltage	V_{OUT}	−0.5~7.0 (Note 1)	V
		−0.5~VCC + 0.5 (Note 2)	
Input Diode Current	I_{IK}	−20	mA
Output Diode Current	I_{OK}	±20 (Note 3)	mA
DC Output Current	I_{OUT}	±25	mA
DC Vcc/Ground Current	I_{CC}	±75	mA
Power Dissipation	P_D	180	mW
Storage Temperature	T_{stg}	−65~150	°C

(Note 1) V_{CC} = 0V
(Note 2) High or Low State. I_{OUT} absolute maximum rating must be observed.
(Note 3) V_{OUT} < GND, V_{OUT} > V_{CC}

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	4.5~5.5	V
Input Voltage	V_{IN}	0~5.5	V
Output Voltage	V_{OUT}	0~5.5 (Note 4)	V
		0~VCC (Note 5)	
Operating Temperature	T_{opr}	−40~85	°C
Input Rise and Fall Time	dt / dV	0~20	ns / V

(Note 4) V_{CC} = 0V
(Note 5) High or Low State

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITON		V_{CC} (V)	Ta = 25°C			Ta = −40~85°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} = −50μA	4.5	4.40	4.50	—	4.40	—	V
			I_{OH} = −8mA	4.5	3.94	—	—	3.80	—	
Low - Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 50μA	4.5	—	0.0	0.10	—	0.10	V
			I_{OL} = 8mA	4.5	—	—	0.36	—	0.44	
3 - State Output Off - State Current	I_{OZ}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = V_{CC} or GND		5.5	—	—	±0.25	—	±2.50	μA
Input Leakage Current	I_{IN}	V_{IN} = 5.5V or GND		0~5.5	—	—	±0.1	—	±1.0	
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		5.5	—	—	4.0	—	40.0	
	I_{CCT}	PER INPUT : VIN = 3.4V OTHER INPUT : VCC or GND		5.5	—	—	1.35	—	1.50	mA
Output Leakage Current	I_{OPD}	V_{OUT} = 5.5V		0	—	—	+0.5	—	+5.0	μA

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3ns$)

PARAMETER	SYMBOL	TEST CONDITION			Ta = 25°C			Ta = −40~85°C		UNIT
			V_{CC} (V)	C_L (pF)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t_{pLH} t_{pHL}		5.0 ± 0.5	15	−	4.7	7.4	1.0	8.5	ns
				50	−	5.2	8.4	1.0	9.5	
3-State Output Enable Time	t_{pZL} t_{pZH}	R_L = 1kΩ	5.0 ± 0.5	15	−	4.9	10.4	1.0	12.0	
				50	−	5.4	11.4	1.0	13.0	
3-State Output Disable Time	t_{pLZ} t_{pHZ}	R_L = 1kΩ	5.0 ± 0.5	50	−	6.3	11.4	1.0	13.0	
Output to Output Skew	t_{osLH} t_{osHL}	(Note 6)	5.0 ± 0.5	50	−	−	1.0	−	1.0	
Input Capacitance	C_{IN}				−	4	10	−	10	pF
Output Capacitance	C_{OUT}				−	9	−	−	−	
Power Dissipation Capacitance (Note 7)	C_{PD}	TC74VHCT367A			−	16	−	−	−	

(Note 6) Parameter guaranteed by design. $t_{osLH} = |t_{pLH\,m} - t_{pLHn}|$, $t_{osHL} = |t_{pHL\,m} - t_{pHLn}|$

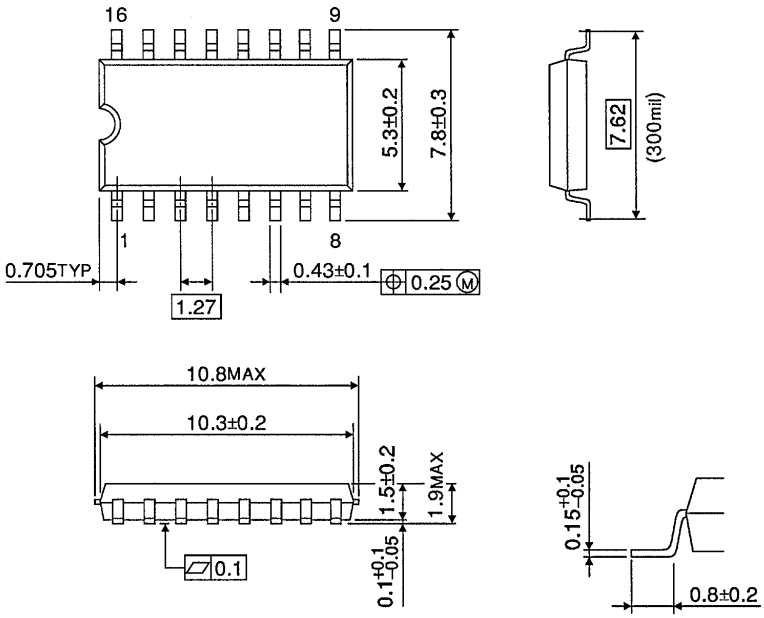
(Note 7) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation:

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

NOISE CHARACTERISTICS (Input $t_r = t_f = 3ns$)

PARAMETER	SYMBOL	TEST CONDITION		Ta = 25°C		UNIT
			V_{CC} (V)	TYP.	MAX.	
Quiet Output Maximum Dynamic V_{OL}	V_{OLP}	C_L = 50pF	5.0	0.6	0.8	V
Quiet Output Minimum Dynamic V_{OL}	V_{OLV}	C_L = 50pF	5.0	−0.6	−0.8	V
Minimum High Level Dynamic Input Voltage	V_{IHD}	C_L = 50pF	5.0	−	2.0	V
Maximum Low Level Dynamic Input Voltage	V_{ILD}	C_L = 50pF	5.0	−	0.8	V

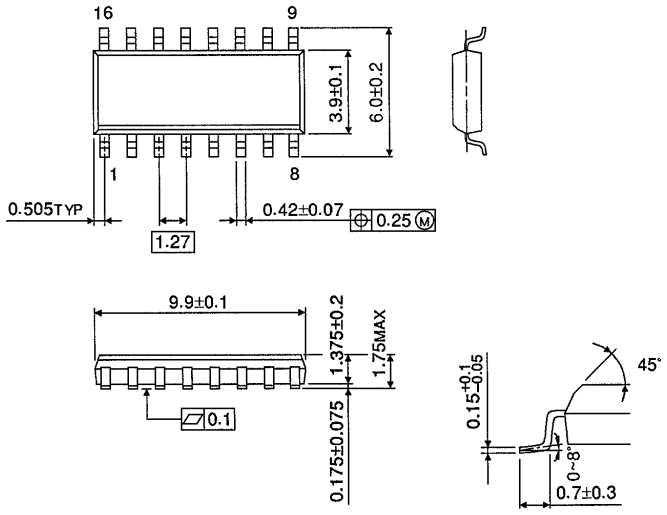
SOP 16PIN (200mil BODY) OUTLINE DRAWING (SOP16-P-300-1.27) Unit in mm



Weight : 0.18g (Typ.)

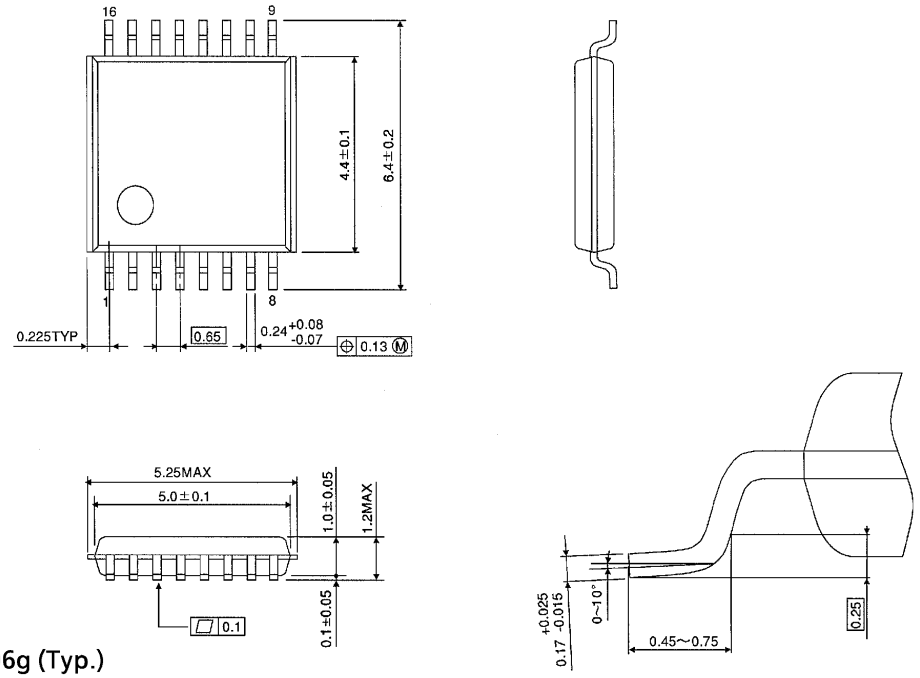
SOP 16PIN (150mil BODY) OUTLINE DRAWING (SOL16-P-150-1.27) Unit in mm

(Note) This package is not available in Japan.



Weight : 0.13g (Typ.)

TSSOP 16PIN OUTLINE DRAWING (TSSOP16-P-0044-0.65) Unit in mm



Weight : 0.06g (Typ.)