

TOSHIBA**TC74HC125AP/AF/AFN,126AP/AF**

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.

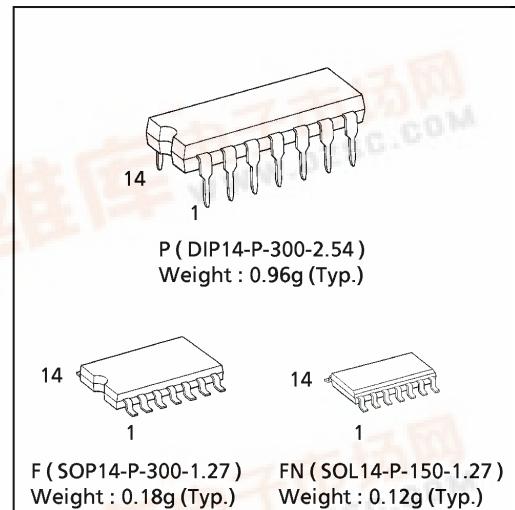
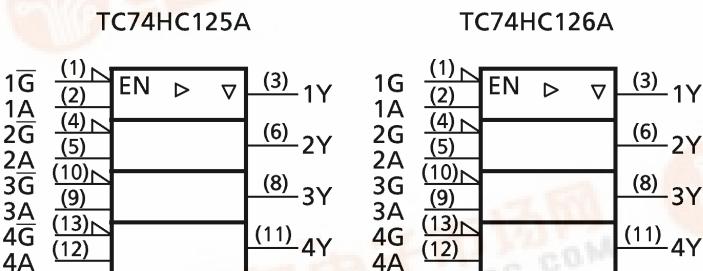
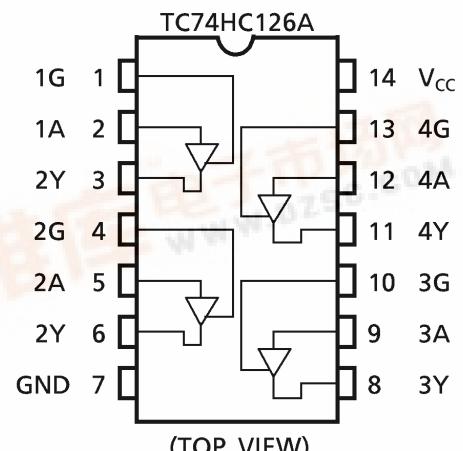
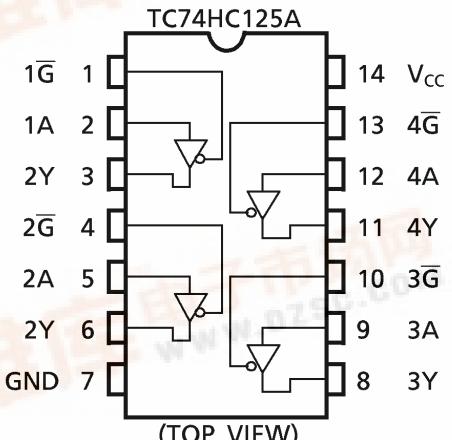
They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

The TC74HC125A requires the 3-state control input \bar{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} (opr.) = $2\text{V} \sim 6\text{V}$
- Pin and Function Compatible with 74LS125/126

IEC LOGIC SYMBOL**PIN ASSIGNMENT**

980508EBA2

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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

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- The information contained herein is subject to change without notice.

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 $T_a = -40^{\circ}\text{C} \sim 65^{\circ}\text{C}$. From $T_a = 65^{\circ}\text{C}$ to 85°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) | 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} | $I_{OH} = -20\mu\text{A}$ | 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 |
| | | | $I_{OH} = -6\text{ mA}$ $I_{OH} = -7.8\text{ mA}$ | 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} | $I_{OL} = 20\mu\text{A}$ | 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 |
| | | | $I_{OL} = 6\text{ mA}$ $I_{OL} = 7.8\text{ mA}$ | 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 $t_r = t_f = 6\text{ns}$)

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

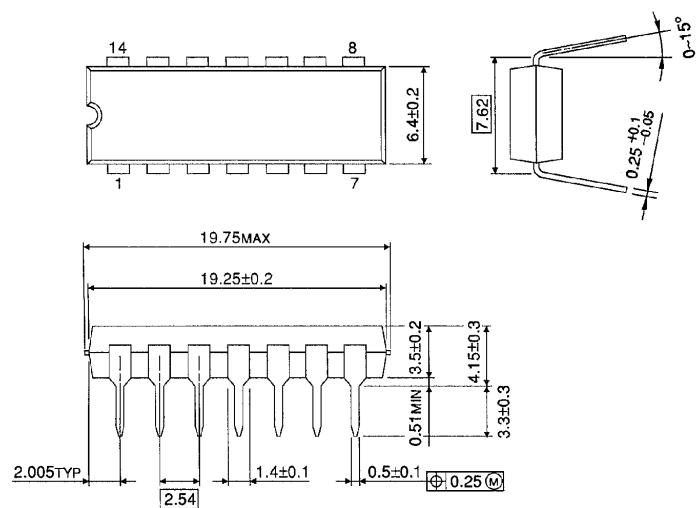
Average operating current can be obtained by the equation :

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

pF

DIP 14PIN OUTLINE DRAWING (DIP14-P-300-2.54)

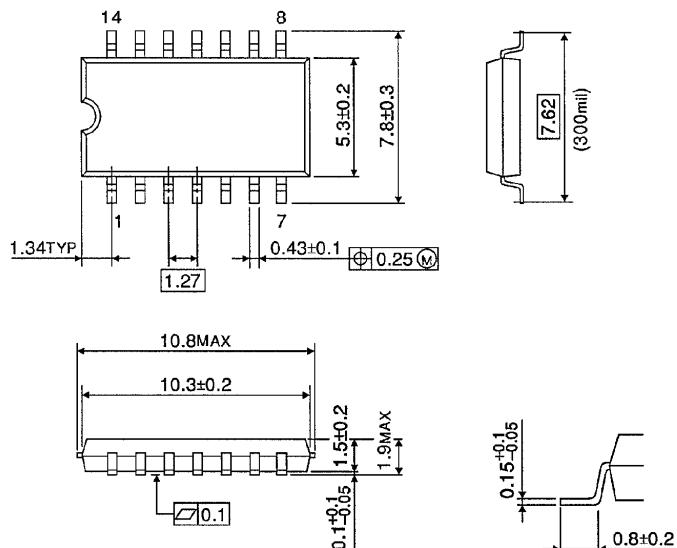
Unit in mm



Weight : 0.96g (Typ.)

SOP 14PIN (200mil BODY) OUTLINE DRAWING (SOP14-P-300-1.27)

Unit in mm

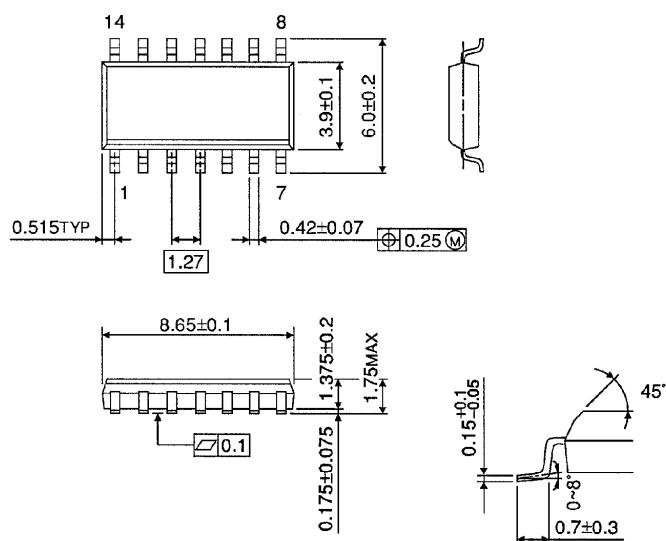


Weight : 0.18g (Typ.)

SOP 14PIN (150mil BODY) OUTLINE DRAWING (SOL14-P-150 -1.27)

Unit in mm

(Note) This package is not available in Japan.



Weight : 0.12g (Typ.)