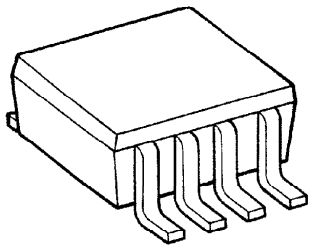
**TENTATIVE** TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TC7W34FU

(UNDER DEVELOPMENT)

## TRIPLE NON-INVERT BUFFER

The TC7W34FU is high speed CMOS BUFFER fabricated with silicon gate CMOS technology.
The internal circuit is composed of 2 stage including buffer output, which enable high noise immunity and stable output.
All inputs are equipped with protection circuits against static discharge or transient excess voltage.



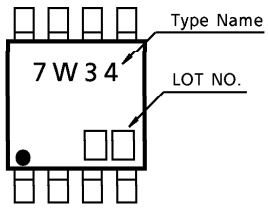
SSOP8-P-0.65

Weight : 0.02g (Typ.)

### FEATURES

- High Speed ····· $t_{pd}$ = 6ns (Typ.) at $V_{CC}$ = 5V
- Low Power Dissipation ····· $I_{CC}$ = 1$\mu$A (Max.) at Ta = 25°C
- High Noise Immunity ····· $V_{NIH} = V_{NIL}$ = 28% $V_{CC}$ (Min.)
- Output Drive Capability ····· 10 LSTTL Loads
- Symmetrical Output Impedance··· $|I_{OH}| = I_{OL}$ = 4mA (Min.)
- Balanced Propagation Delays····· $t_{pLH} \fallingdotseq t_{pHL}$
- Wide Operating Voltage Range··· $V_{CC}$ (opr) = 2~6V

### MARKING




### MAXIMUM RATINGS (Ta = 25°C)

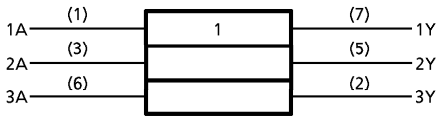
| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Supply Voltage Range | $V_{CC}$ | −0.5~7 | V |
| DC Input Voltage | $V_{IN}$ | −0.5~$V_{CC}$ + 0.5 | V |
| DC Output Voltage | $V_{OUT}$ | −0.5~$V_{CC}$ + 0.5 | V |
| Input Diode Current | $I_{IK}$ | ± 20 | mA |
| Output Diode Current | $I_{OK}$ | ± 20 | mA |
| DC Output Current | $I_{OUT}$ | ± 25 | mA |
| DC $V_{CC}$ / Ground Current | $I_{CC}$ | ± 25 | mA |
| Power Dissipation | $P_D$ | 300 | mW |
| Storage Temperature | $T_{stg}$ | −65~150 | °C |
| Lead Temperature (10 s) | $T_L$ | 260 | °C |

### TRUTH TABLE

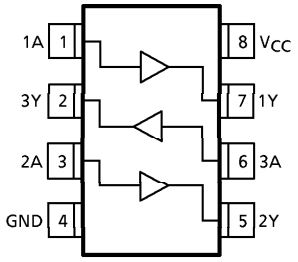
| A | Y |
|---|---|
| L | L |
| H | H |

961001EBA2

**LOGIC DIAGRAM**




**PIN ASSIGNMENT** (TOP VIEW)




**RECOMMENDED OPERATING CONDITIONS**

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Supply Voltage Range | $V_{CC}$ | 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) | ns |
| | | 0~500 ($V_{CC}$ = 4.5V) | |
| | | 0~400 ($V_{CC}$ = 6.0V) | |

**DC ELECTRICAL CHARACTERISTICS**

| CHARACTERISTIC | SYMBOL | TEST CONDITION | | $V_{CC}$ | 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 | 1.5 | — | — | 1.5 | — | V |
| | | | | 4.5 | 3.15 | — | — | 3.15 | — | |
| | | | | 6.0 | 4.2 | — | — | 4.2 | — | |
| Low-Level Input Voltage | $V_{IL}$ | | | 2.0 | — | — | 0.5 | — | 0.5 | V |
| | | | | 4.5 | — | — | 1.35 | — | 1.35 | |
| | | | | 6.0 | — | — | 1.8 | — | 1.8 | |
| High-Level Output Voltage | $V_{OH}$ | $V_{IN}$ = $V_{IH}$ | $I_{OH}$ = −20μA | 2.0 | 1.9 | 2.0 | — | 1.9 | — | V |
| | | | | 4.5 | 4.4 | 4.5 | — | 4.4 | — | |
| | | | | 6.0 | 5.9 | 6.0 | — | 5.9 | — | |
| | | | $I_{OH}$ = −4mA | 4.5 | 4.18 | 4.31 | — | 4.13 | — | |
| | | | $I_{OH}$ = −5.2mA | 6.0 | 5.68 | 5.80 | — | 5.63 | — | |
| Low-Level Output Voltage | $V_{OL}$ | $V_{IN}$ = $V_{IL}$ | $I_{OL}$ = 20μA | 2.0 | — | 0.0 | 0.1 | — | 0.1 | V |
| | | | | 4.5 | — | 0.0 | 0.1 | — | 0.1 | |
| | | | | 6.0 | — | 0.0 | 0.1 | — | 0.1 | |
| | | | $I_{OL}$ = 4mA | 4.5 | — | 0.17 | 0.26 | — | 0.33 | |
| | | | $I_{OL}$ = 5.2mA | 6.0 | — | 0.18 | 0.26 | — | 0.33 | |
| 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 | — | — | 1.0 | — | 10.0 | μA |

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**AC ELECTRICAL CHARACTERISTICS** ($C_L$ = 15pF, $V_{CC}$ = 5V, Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | Ta = 25°C | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN. | TYP. | MAX. | |
| Output Transition Time | $t_{TLH}$ $t_{THL}$ | — | — | 4 | 8 | ns |
| Propagation Delay Time | $t_{pLH}$ $t_{pHL}$ | — | — | 6 | 12 | ns |

**AC ELECTRICAL CHARACTERISTICS** ($C_L$ = 50pF, Input $t_r = t_f$ = 6ns)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | | Ta = 25°C | | | Ta = −40~85°C | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | $V_{CC}$ | MIN. | TYP. | MAX. | MIN. | MAX. | |
| Output Transition Time | $t_{TLH}$ $t_{THL}$ | — | 2.0 | — | 30 | 75 | — | 95 | ns |
| | | | 4.5 | — | 8 | 15 | — | 19 | |
| | | | 6.0 | — | 7 | 13 | — | 16 | |
| Propagation Delay Time | $t_{pLH}$ $t_{pHL}$ | — | 2.0 | — | 27 | 75 | — | 95 | ns |
| | | | 4.5 | — | 9 | 15 | — | 19 | |
| | | | 6.0 | — | 8 | 13 | — | 16 | |
| Input Capacitance | $C_{IN}$ | — | | — | 5 | 10 | — | 10 | pF |
| Power Dissipation Capacitance | $C_{PD}$ | (Note 1) | | — | 20 | — | — | — | pF |

(Note 1) : $C_{PD}$ is defined as the value of the internal equivalent capacitance of IC which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation hereunder.

$$I_{CC\,(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 3 \text{ (per gate)}$$

**SWITCHING CHARACTERISTICS TEST CIRCUIT**