

TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

# TC7WB126FK

## Dual Bus Switch

The TC7WB126FK is a low on-resistance, high-speed CMOS dual-bit bus switch. This bus switch allows the connections or disconnections to be made with minimal propagation delay while maintaining Low power dissipation which is the feature of CMOS.

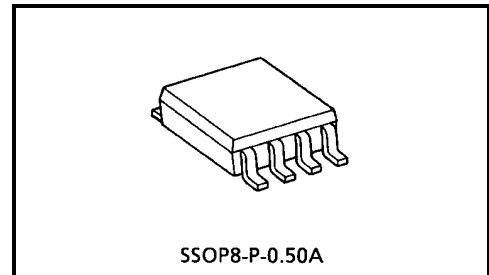
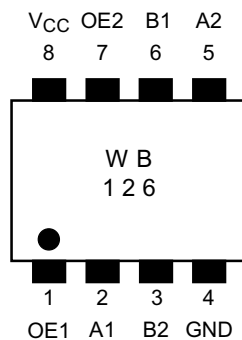
When output enable (OE) is at High level, the switch is on; when at Low level, the switch is off.

All inputs are equipped with protector circuits to protect the device from static discharge.

### Features

- Operating voltage:  $V_{CC} = 4.5\sim 5.5\text{ V}$
- High speed operation:  $t_{pd} = 0.25\text{ ns (max)}$
- Ultra-low on resistance:  $R_{ON} = 5\ \Omega\text{ (typ.)}$
- Electro-static discharge (ESD) performance:  $\pm 200\text{ V or more (EIAJ)}$   
 $\pm 2000\text{ V or more (MIL)}$
- TTL level input (control input)
- Package: US8

### Pin Assignment (top view)



Weight: 0.01 g (typ.)

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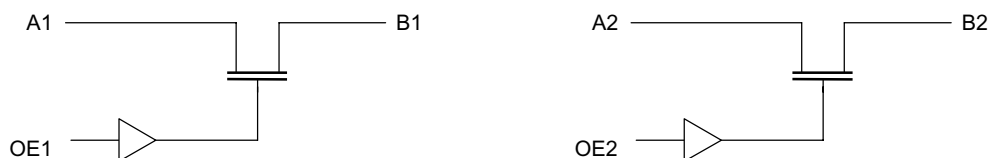
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## Truth Table

| Inputs | Function        |
|--------|-----------------|
| OE     |                 |
| L      | Disconnect      |
| H      | A port = B port |

## System Diagram



## Maximum Ratings

| Characteristics            | Symbol           | Rating    | Unit        |
|----------------------------|------------------|-----------|-------------|
| Power supply range         | $V_{CC}$         | -0.5~7.0  | V           |
| DC input voltage           | $V_{IN}$         | -0.5~7.0  | V           |
| DC switch voltage          | $V_S$            | -0.5~7.0  | V           |
| Input diode current        | $I_{IK}$         | -50       | mA          |
| Continuous channel current | $I_S$            | 128       | mA          |
| Power dissipation          | $P_D$            | 200       | mW          |
| DC $V_{CC}/GND$ current    | $I_{CC}/I_{GND}$ | $\pm 100$ | mA          |
| Storage temperature        | $T_{stg}$        | -65~150   | $^{\circ}C$ |

## Recommended Operating Conditions

| Characteristics          | Symbol    | Rating  | Unit        |
|--------------------------|-----------|---------|-------------|
| Supply voltage           | $V_{CC}$  | 4.5~5.5 | V           |
| Input voltage            | $V_{IN}$  | 0~5.5   | V           |
| Switch voltage           | $V_S$     | 0~5.5   | V           |
| Operating temperature    | $T_{opr}$ | -40~85  | $^{\circ}C$ |
| Input rise and fall time | dt/dv     | 0~10    | ns/V        |

## Electrical Characteristics

### DC Characteristics (Ta = -40~85°C)

| Characteristics                           |           | Symbol           | Test Condition   |                         | V <sub>CC</sub> (V) | Min | Typ.<br>(Note1) | Max  | Unit |
|---|-----------|------------------|--|-------------------------|---------------------|-----|-----------------|------|------|
|   |           |                  |  |                         |                     |     |                 |      |      |
| Input voltage                             | "H" level | V <sub>IH</sub>  | —  |                         | 4.5~5.5             | 2.0 | —               | —    | V    |
|   | "L" level | V <sub>IL</sub>  | —  |                         | 4.5~5.5             | —   | —               | 0.8  |      |
| Input leakage current                     |           | I <sub>IN</sub>  | V <sub>IN</sub> = 0~5.5 V  |                         | 5.5                 | —   | —               | ±1.0 | μA   |
| Off-state leakage current<br>(switch off) |           | I <sub>SZ</sub>  | A, B = 0~5.5 V, OE = GND   |                         | 0~5.5               | —   | —               | ±1.0 | μA   |
| ON resistance<br><br>(Note2)              |           | R <sub>ON</sub>  | V <sub>IS</sub> = 0 V  | I <sub>IS</sub> = 30 mA | 4.5                 | —   | 5               | 7    | Ω    |
|   |           |                  |  | I <sub>IS</sub> = 64 mA | 4.5                 | —   | 5               | 7    |      |
|   |           |                  | V <sub>IS</sub> = 2.4 V, I <sub>IS</sub> = 15 mA                 |                         | 4.5                 | —   | 10              | 15   |      |
| Quiescent supply current                  |           | I <sub>CC</sub>  | V <sub>IN</sub> = V <sub>CC</sub> or GND<br>I <sub>OUT</sub> = 0 |                         | 5.5                 | —   | —               | 10   | mA   |
|   |           | ΔI <sub>CC</sub> | V <sub>IN</sub> = 3.4 V (one input)                              |                         | 5.5                 | —   | —               | 2.5  | mA   |

Note1: Typical values are at V<sub>CC</sub> = 5 V and Ta = 25°C.

Note2: Measured by the voltage drop between A and B pins at the indicated current through the switch. On resistance is determined by the lower of the voltages on the two (A or B) pins.

### AC Characteristics (Ta = -40~85°C)

| Characteristics                        |  | Symbol                               | Test Condition                    |  | V <sub>CC</sub> (V) | Min | Max  | Unit |
|--|--|--------------------------------------|-----------------------------------|--|---------------------|-----|------|------|
|  |  |                                      |                                   |  |                     |     |      |      |
| Propagation delay time<br>(bus to bus) |  | t <sub>pLH</sub><br>t <sub>pHL</sub> | Figure 1, Figure 2<br><br>(Note3) |  | 4.5                 | —   | 0.25 | ns   |
| Output enable time                     |  | t <sub>pZL</sub><br>t <sub>pZH</sub> | Figure 1, Figure 3                |  | 4.5                 | —   | 4.0  | ns   |
| Output disable time                    |  | t <sub>pLZ</sub><br>t <sub>pHZ</sub> | Figure 1, Figure 3                |  | 4.5                 | —   | 5.5  | ns   |

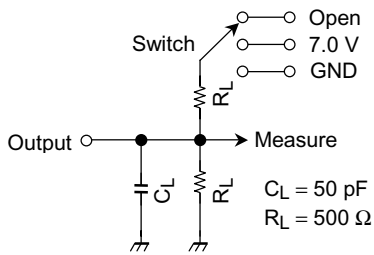
Note3: The propagation delay time is calculated by the RC (on-resistance and load capacitance) time constant.

### Capacitive Characteristics (Ta = 25°C)

| Characteristics               |  | Symbol           | Test Condition |  | V <sub>CC</sub> (V) | Typ. | Unit |    |
|-------------------------------|--|------------------|----------------|--|---------------------|------|------|----|
|                               |  |                  |                |  |                     |      |      |    |
| Control pin input capacitance |  | C <sub>IN</sub>  | (Note4)        |  | 5.0                 | 3    | pF   |    |
| Switch terminal capacitance   |  | C <sub>I/O</sub> | OE = GND       |  | (Note4)             | 5.0  | 10   | pF |

Note4: This item is guaranteed by design.

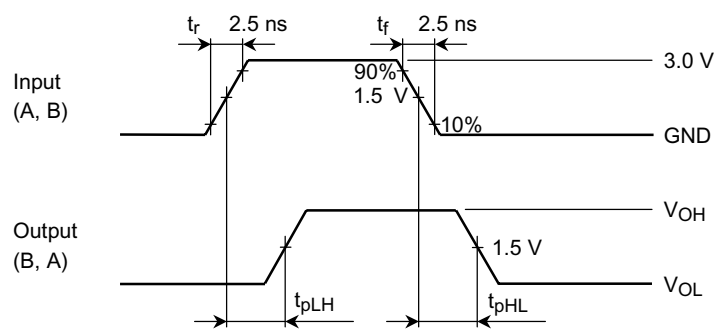
**AC Test Circuit**



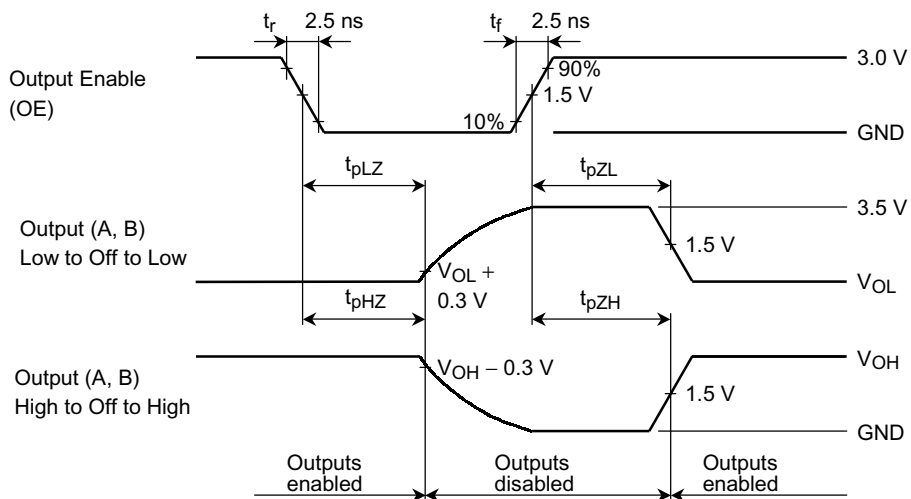
| Parameter             | Switch |
|-----------------------|--------|
| $t_{pLH}$ , $t_{pHL}$ | Open   |
| $t_{pLZ}$ , $t_{pZL}$ | 7.0 V  |
| $t_{pHZ}$ , $t_{pZH}$ | Open   |

**Figure 1**

**AC Waveform**



**Figure 2  $t_{pLH}$ ,  $t_{pHL}$**

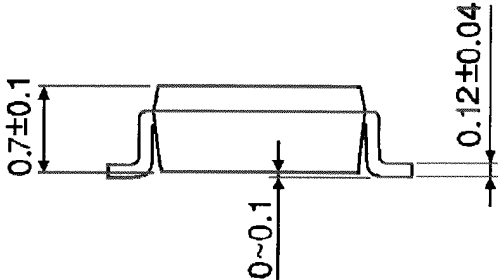
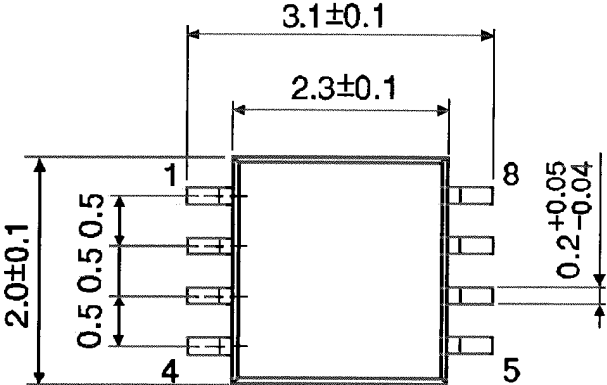


**Figure 3  $t_{pLZ}$ ,  $t_{pHZ}$ ,  $t_{pZL}$ ,  $t_{pZH}$**

Package Dimensions

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)