

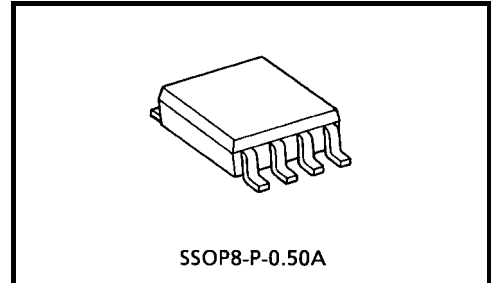
# TC7WB125FK

## Dual Bus Switch

The TC7WB125FK is a low on-resistance, high-speed CMOS 2-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 ( $\overline{OE}$ ) is at low level, the switch is on; when at high level, the switch is off.

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

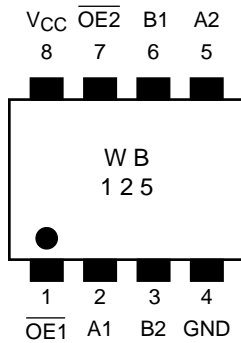


Weight: 0.01 g (typ.)

## Features

- Operating voltage:  $V_{CC} = 4.5\sim 5.5$  V
- High speed operation:  $t_{pd} = 0.25$  ns (max)
- Ultra-low on resistance:  $R_{ON} = 5 \Omega$  (typ.)
- ESD performance: Machine model  $\geq \pm 200$  V  
Human body model  $\geq \pm 2000$  V
- TTL level input (control input)
- Package: US8

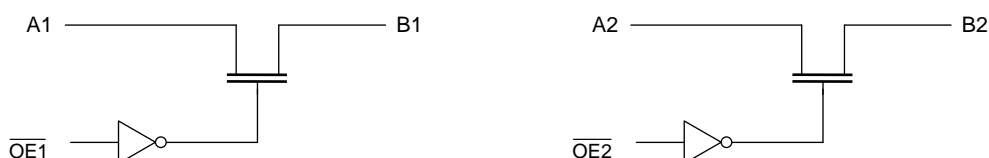
## Pin Assignment (top view)



## Truth Table

Inputs	Function
$\overline{OE}$	
L	A port = B port
H	Disconnect

## System Diagram



## Absolute Maximum Ratings (Note)

Characteristics	Symbol	Rating	Unit
Power supply voltage	$V_{CC}$	-0.5~7.0	V
Control pin input voltage	$V_{IN}$	-0.5~7.0	V
Switch terminal I/O voltage	$V_S$	-0.5~7.0	V
Clump diode current	$I_{IK}$	-50	mA
Switch I/O 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	$^{\circ}C$

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

## Operating Ranges (Note)

Characteristics	Symbol	Rating	Unit
Power supply voltage	$V_{CC}$	4.5~5.5	V
Control pin input voltage	$V_{IN}$	0~5.5	V
Switch I/O voltage	$V_S$	0~5.5	V
Operating temperature	$T_{opr}$	-40~85	$^{\circ}C$
Control pin input rise/fall time	dt/dv	0~10	ns/V

Note: The operating ranges must be maintained to ensure the normal operation of the device. Unused inputs must be tied to either  $V_{CC}$  or GND.

## Electrical Characteristics

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

Characteristics	Symbol	Test Condition	V <sub>CC</sub> (V)	Min	Typ. (Note 1)	Max	Unit	
Control pin 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		4.5~5.5	—	—	±1.0	μA
Power off leakage current	I <sub>OFF</sub>	A, B, $\overline{OE}$ = 0~5.5 V		0	—	—	±1.0	μA
Off-state leakage current (switch off)	I <sub>SZ</sub>	A, B = 0~5.5 V, $\overline{OE}$ = V <sub>CC</sub>		4.5~5.5	—	—	±1.0	μA
ON resistance (Note 2)	R <sub>ON</sub>	V <sub>IS</sub> = 0 V	I <sub>IS</sub> = 64 mA	4.5	—	5	7	Ω
			I <sub>IS</sub> = 30 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 I <sub>OUT</sub> = 0		5.5	—	—	10	μA
	ΔI <sub>CC</sub>	V <sub>IN</sub> = 3.4 V (one input)		5.5	—	—	2.5	mA

Note1: The typical values are at V<sub>CC</sub> = 5 V, Ta = 25°C.

Note2: Apply the specified current to the switch, then measure the voltages on pins A and B. The on-resistance is the lower of the two.

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

Characteristics	Symbol	Test Condition	V <sub>CC</sub> (V)	Min	Max	Unit
Propagation delay time (bus to bus)	t <sub>pLH</sub> t <sub>pHL</sub>	Figure 1, Figure 2 (Note)	4.5	—	0.25	ns
Output enable time	t <sub>pZL</sub> t <sub>pZH</sub>	Figure 1, Figure 3	4.5	—	4.0	ns
Output disable time	t <sub>pLZ</sub> t <sub>pHZ</sub>	Figure 1, Figure 3	4.5	—	5.0	ns

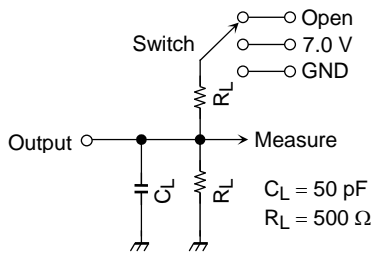
Note: The propagation delay time is calculated by the RC (on-resistance and load capacitance) time constant.

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

Characteristics	Symbol	Test Condition	V <sub>CC</sub> (V)	Typ.	Unit	
Control pin input capacitance	C <sub>IN</sub>	(Note)	5.0	3	pF	
Switch terminal capacitance	C <sub>I/O</sub>	$\overline{OE}$ = V <sub>CC</sub>	(Note)	5.0	10	pF

Note: This item is guaranteed by design.

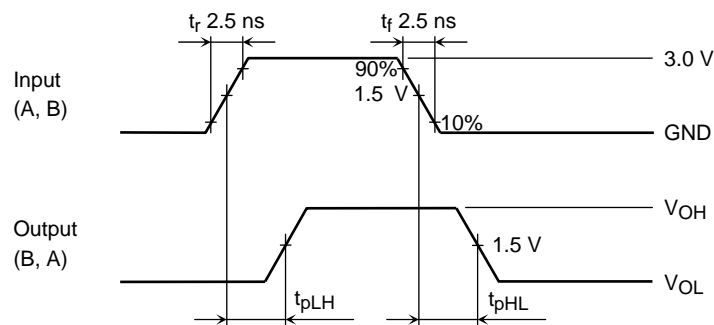
**AC Test Circuit**



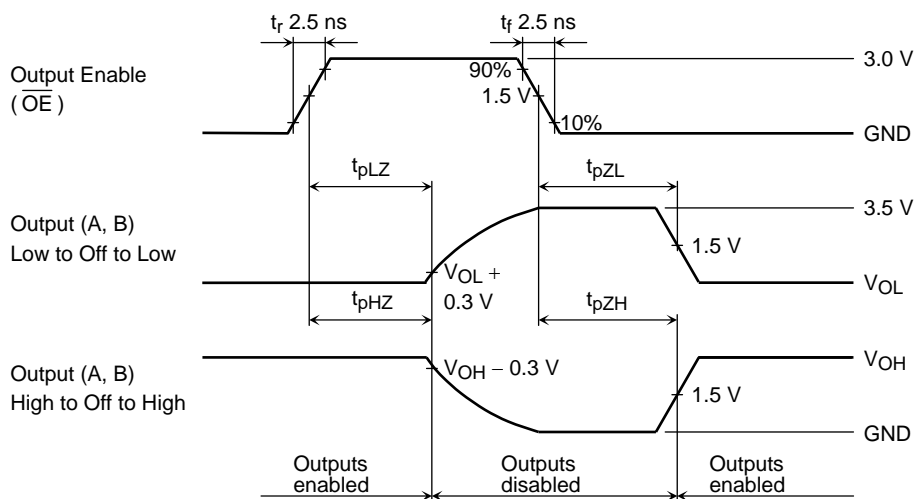
Parameter	Switch
$t_{pLH}$ , $t_{pHL}$	Open
$t_{pLZ}$ , $t_{pZL}$	7.0 V
$t_{pHZ}$ , $t_{pZH}$	Open

**Figure 1**

**AC Waveform**



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

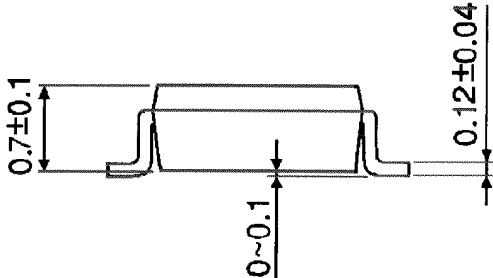
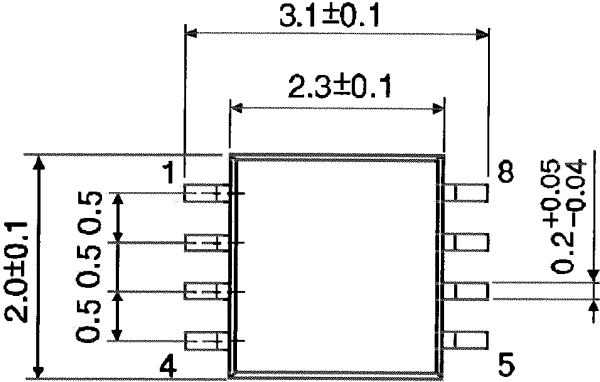


**Figure 3  $t_{pLZ}$ ,  $t_{pHZ}$ ,  $t_{pZL}$ ,  $t_{pZH}$**

**Package Dimensions**

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)

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