

TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

## TC7WBD126FK

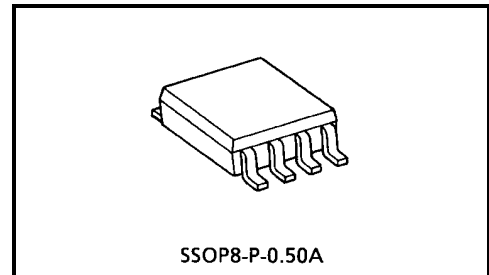
### Dual Bus Switch with Level Shift

The TC7WBD126FK 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.

The internal diode on the power supply line allows signal range of 3.3 V~5 V.

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

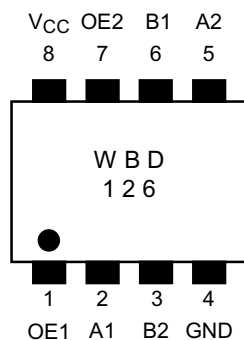


Weight: 0.01 g (typ.)

### Features

- Operating voltage:  $V_{CC} = 4.5\sim 5.5\text{ V}$
- 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)



980910EBA1

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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		Min	Typ. (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	
High-level output voltage		V <sub>OH</sub>	Figure 4		—	—	—	—
Input leakage current		I <sub>IN</sub>	V <sub>IN</sub> = 0~5.5 V		5.5	—	±1.0	μA
Off-state leakage current (switch off)		I <sub>SZ</sub>	A, B = 0~5.5 V, OE = GND		0~5.5	—	±1.0	μA
ON resistance  (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	—	35	50	
Quiescent supply current	I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND I <sub>OUT</sub> = 0	Switch ON	5.5	—	—	1.5	mA
			Switch OFF	5.5	—	—	10	μA
	ΔI <sub>CC</sub>	V <sub>IN</sub> = 3.4 V (one input)	(Note3)	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.

Note3: Quiescent supply current at V<sub>CC</sub> = 3.4 V will be sum of I<sub>CC</sub> and ΔI<sub>CC</sub>.

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

Characteristics		Symbol	Test Condition		Min	Max	Unit	
								V <sub>CC</sub> (V)
Propagation delay time (bus to bus)		t <sub>pLH</sub> t <sub>pHL</sub>	Figure 1, Figure 2 (Note4)		4.5	—	0.25	ns
Output enable time		t <sub>pZL</sub> t <sub>pZH</sub>	Figure 1, Figure 3		4.5	—	4.5	ns
Output disable time		t <sub>pLZ</sub> t <sub>pHZ</sub>	Figure 1, Figure 3		4.5	—	5.5	ns

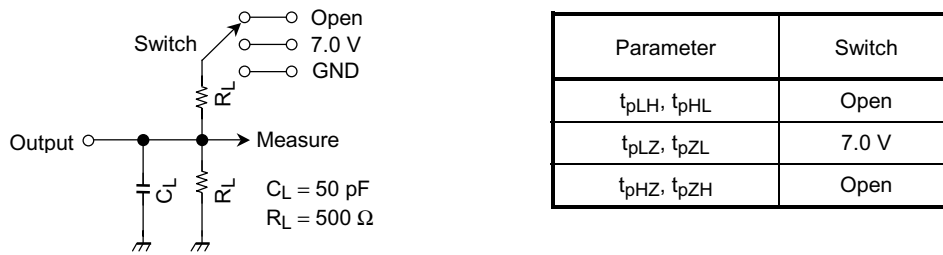
Note4: The propagation delay time is calculated by the RC (on-resistance and load capacitance) time constant.

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

Characteristics		Symbol	Test Condition		Typ.	Unit		
							V <sub>CC</sub> (V)	
Control pin input capacitance		C <sub>IN</sub>	(Note5)		5.0	3	pF	
Switch terminal capacitance		C <sub>I/O</sub>	OE = GND		(Note5)	5.0	10	pF

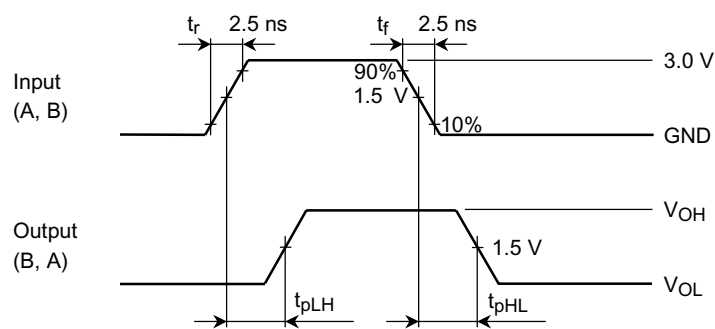
Note5: This parameter is guaranteed by design.

**AC Test Circuit**

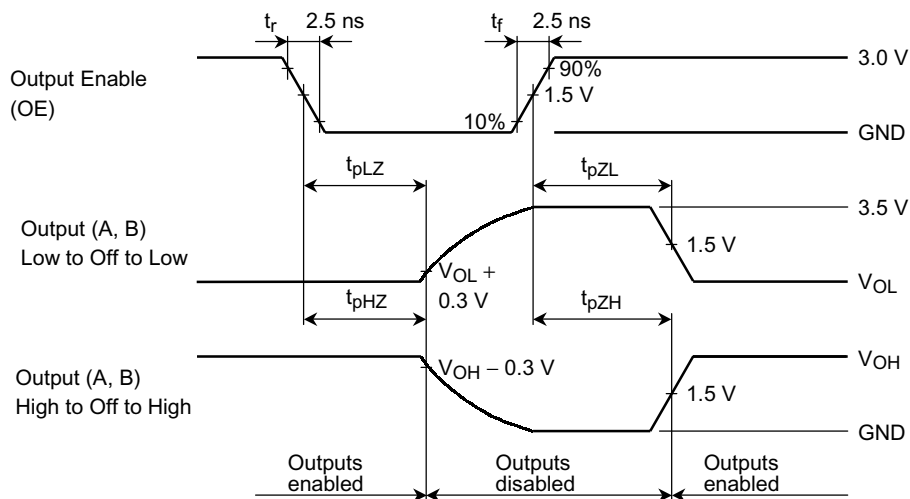


**Figure 1**

**AC Waveform**

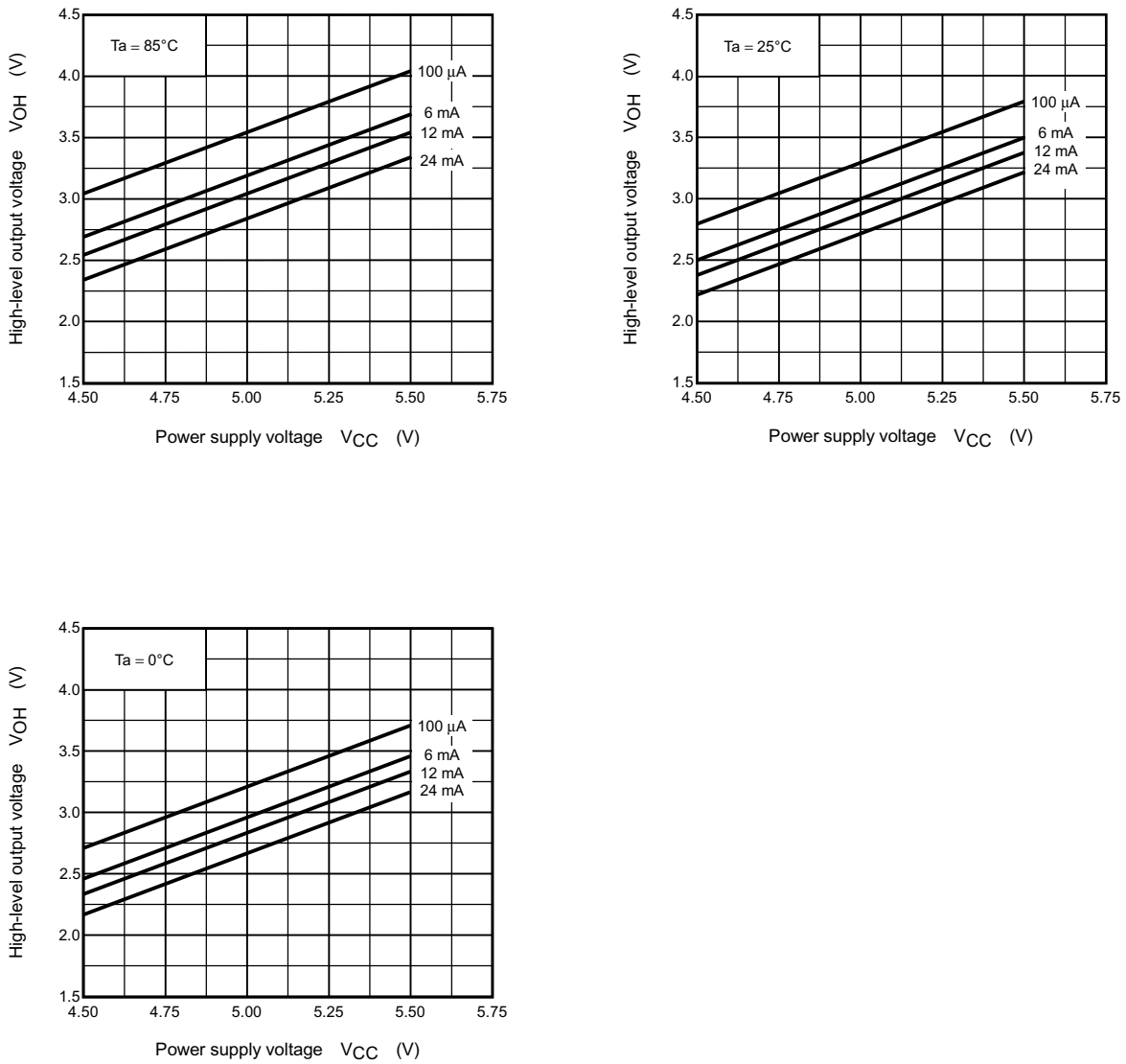


**Figure 2  $t_{pLH}$ ,  $t_{pHL}$**



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

**$V_{OH} - V_{CC}$  Characteristics (typ.)**

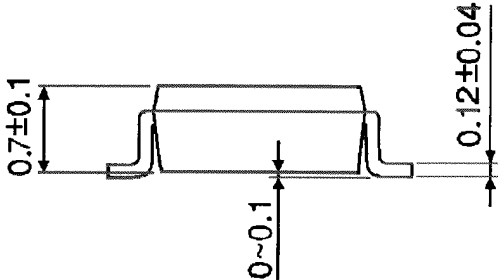
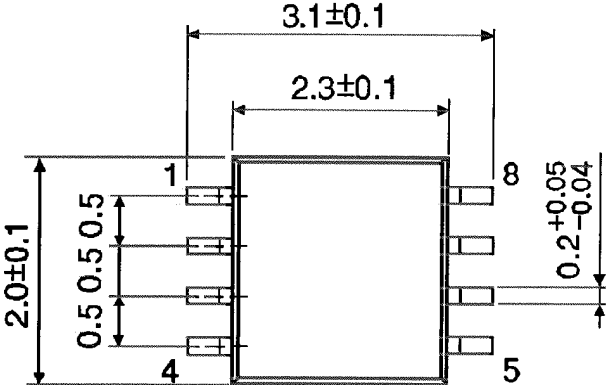


**Figure 4**

Package Dimensions

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)