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.

SSOP8-P-0.50A

Weight: 0.01 g (typ.)

Features

- Operating voltage: V_{CC} = 4.5~5.5 V

- High speed operation: t_{pd} = 0.25 ns (max)

- Ultra-low on resistance: R_{ON} = 5 Ω (typ.)

- Electro-static discharge (ESD) performance: ±200 V or more (JEITA)
  ±2000 V or more (MIL)

- TTL level input (control input)

- Package: US8

Pin Assignment (top view)

V_{CC}	OE2	B1	A2
8	7	6	5

W B
1 2 6

1	2	3	4
OE1	A1	B2	GND
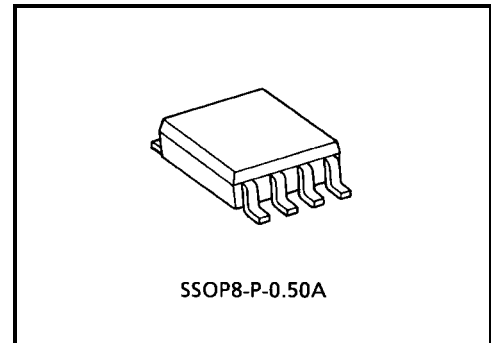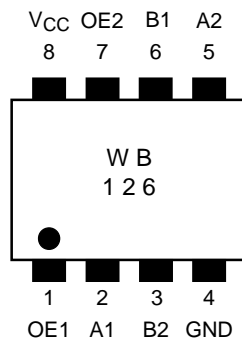
Truth Table

Inputs	Function
OE	
L	Disconnect
H	A port = B port

System Diagram

A1 ——————— B1   A2 ——————— B2

OE1 ▷   OE2 ▷
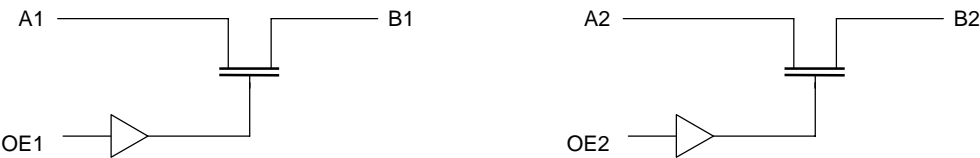
Maximum Ratings

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}	±100	mA
Storage temperature	T_{stg}	−65~150	°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	°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_CC (V)	Min	Typ. (Note1)	Max	Unit
Input voltage	"H" level	V_{IH}	—		4.5~5.5	2.0	—	—	V
	"L" level	V_{IL}	—		4.5~5.5	—	—	0.8	
Input leakage current		I_{IN}	V_{IN} = 0~5.5 V		4.5~5.5	—	—	±1.0	μA
Power off leakage current		I_{OFF}	A, B, OE = 0~5.5 V		0	—	—	±1.0	μA
Off-state leakage current (switch off)		I_{SZ}	A, B = 0~5.5 V, OE = GND		4.5~5.5	—	—	±1.0	μA
ON resistance (Note2)		R_{ON}	V_{IS} = 0 V	I_{IS} = 30 mA	4.5	—	5	7	Ω
				I_{IS} = 64 mA	4.5	—	5	7	
			V_{IS} = 2.4 V, I_{IS} = 15 mA		4.5	—	10	15	
Quiescent supply current		I_{CC}	V_{IN} = V_{CC} or GND I_{OUT} = 0		5.5	—	—	10	μA
		ΔI_{CC}	V_{IN} = 3.4 V (one input)		5.5	—	—	2.5	mA

Note1: Typical values are at V_{CC} = 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_CC (V)	Min	Max	Unit
Propagation delay time (bus to bus)	t_{pLH} t_{pHL}	Figure 1, Figure 2	(Note3)	4.5	—	0.25	ns
Output enable time	t_{pZL} t_{pZH}	Figure 1, Figure 3		4.5	—	4.0	ns
Output disable time	t_{pLZ} t_{pHZ}	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_CC (V)	Typ.	Unit
Control pin input capacitance	C_{IN}		(Note4)	5.0	3	pF
Switch terminal capacitance	$C_{I/O}$	OE = GND	(Note4)	5.0	10	pF

Note4: This item is guaranteed by design.

AC Test Circuit

Switch

Open
7.0 V
GND

R_L

Output — Measure

C_L R_L

C_L = 50 pF
R_L = 500 Ω

Parameter	Switch
t_{pLH}, t_{pHL}	Open
t_{pLZ}, t_{pZL}	7.0 V
t_{pHZ}, t_{pZH}	Open
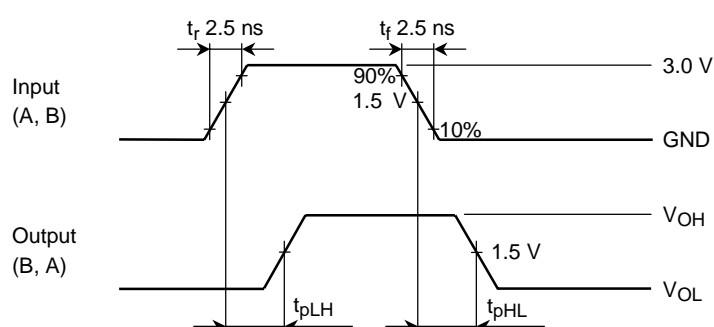
Figure 1

AC Waveform

t_r 2.5 ns t_f 2.5 ns

Input
(A, B)

90%
1.5 V
10%

3.0 V

GND

Output
(B, A)

V_{OH}
1.5 V
V_{OL}

t_{pLH} t_{pHL}

Figure 2 t_{pLH}, t_{pHL}

t_r 2.5 ns t_f 2.5 ns

Output Enable
(OE)

90%
1.5 V
10%

3.0 V

GND

t_{pLZ} t_{pZL}

Output (A, B)
Low to Off to Low

V_{OL} +
0.3 V

3.5 V
1.5 V
V_{OL}

t_{pHZ} t_{pZH}

Output (A, B)
High to Off to High

V_{OH} − 0.3 V

V_{OH}
1.5 V
GND

Outputs
enabled

Outputs
disabled

Outputs
enabled

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

Package Dimensions

SSOP8-P-0.50A   Unit : mm
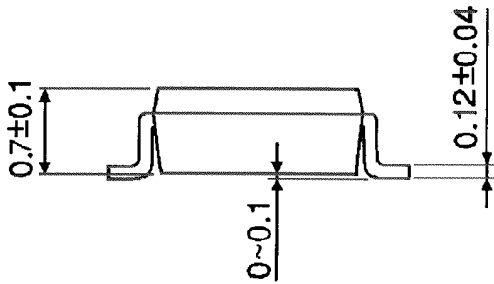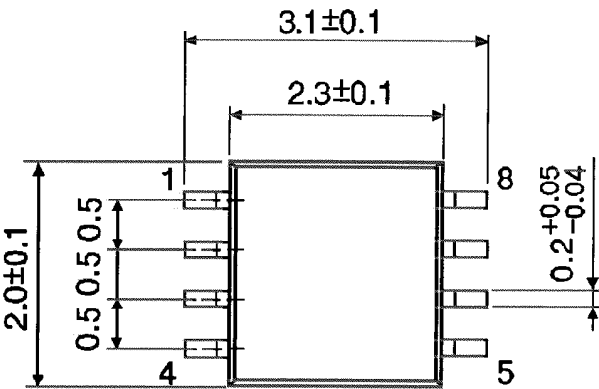
Weight: 0.01 g (typ.)

RESTRICTIONS ON PRODUCT USE