TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC7WBD126FK

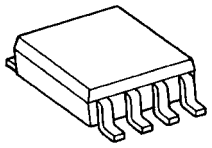
Dual Bus Switch with Level Shift

The TC7WBD126FK 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 (OE) is at High level, the switch is on; when at Low level, the switch is off.

The internal diode which adds to power supply line is enable to realize the shift of signal level from 5 V to 3.3 V. (Note 1)

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



SSOP8-P-0.50A

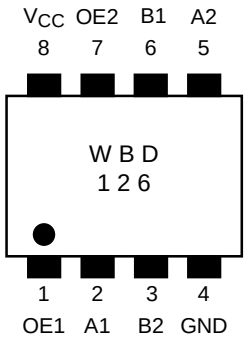
Weight: 0.01 g (typ.)

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

Note 1: In case that over-shoot noise is detected, this device should be used with clamp diode to prevent the next stage device from over-stress.

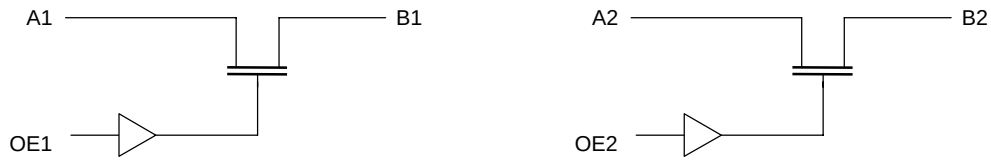
Pin Assignment (top view)



Truth Table

Inputs OE	Function
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}	±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. (Note 2)	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	
High-level output voltage		V_{OH}	Figure 4		—	—	—	—	—
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 (Note 3)		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	—	35	50	
Quiescent supply current		I_{CC}	V_{IN} = V_{CC} or GND, I_{OUT} = 0	Switch ON	5.5	—	—	1.5	mA
				Switch OFF	5.5	—	—	10	μA
		ΔI_{CC}	V_{IN} = 3.4 V (one input)	(Note 4)	5.5	—	—	2.5	mA

Note 2: Typical values are at V_{CC} = 5 V and Ta = 25°C.

Note 3: 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.

Note 4: Quiescent supply current at V_{CC} = 3.4 V will be sum of I_{CC} and ΔI_{CC}.

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	(Note 5)	4.5	—	0.25	ns
Output enable time	t_{pZL} t_{pZH}	Figure 1, Figure 3		4.5	—	4.5	ns
Output disable time	t_{pLZ} t_{pHZ}	Figure 1, Figure 3		4.5	—	5.5	ns

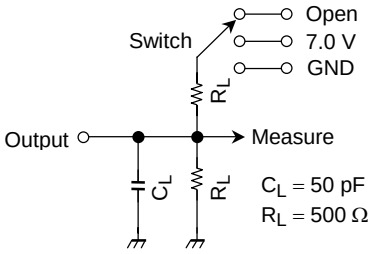
Note 5: The propagation delay time is calculated by the RC (on-resistance and load capacitance) time constant.

Capacitive Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition		V_{CC} (V)	Typ.	Unit
Control pin input capacitance	C_{IN}		(Note 6)	5.0	3	pF
Switch terminal capacitance	$C_{I/O}$	OE = GND	(Note 6)	5.0	10	pF

Note 6: This parameter 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

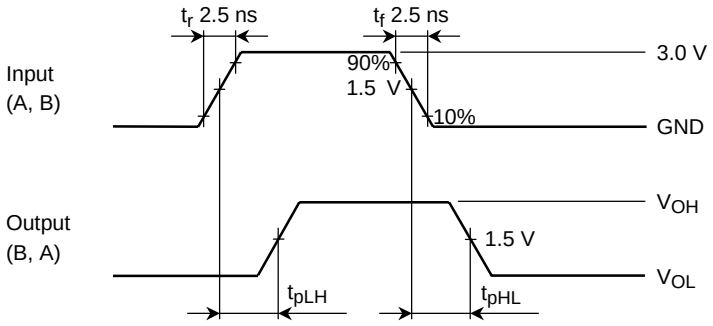


Figure 2 t_{pLH}, t_{pHL}

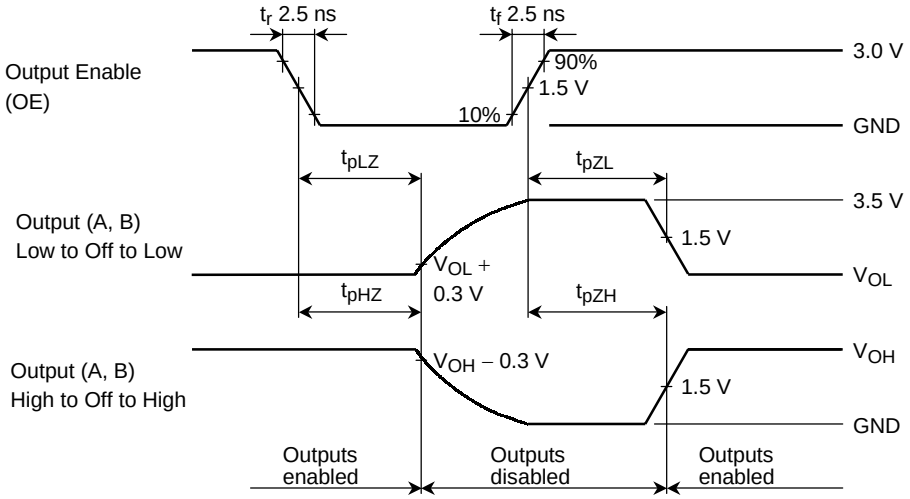


Figure 3 t_{pLZ}, t_{pHZ}, t_{pZL}, t_{pZH}

V_{OH} – V_{CC} Characteristics (typ.)

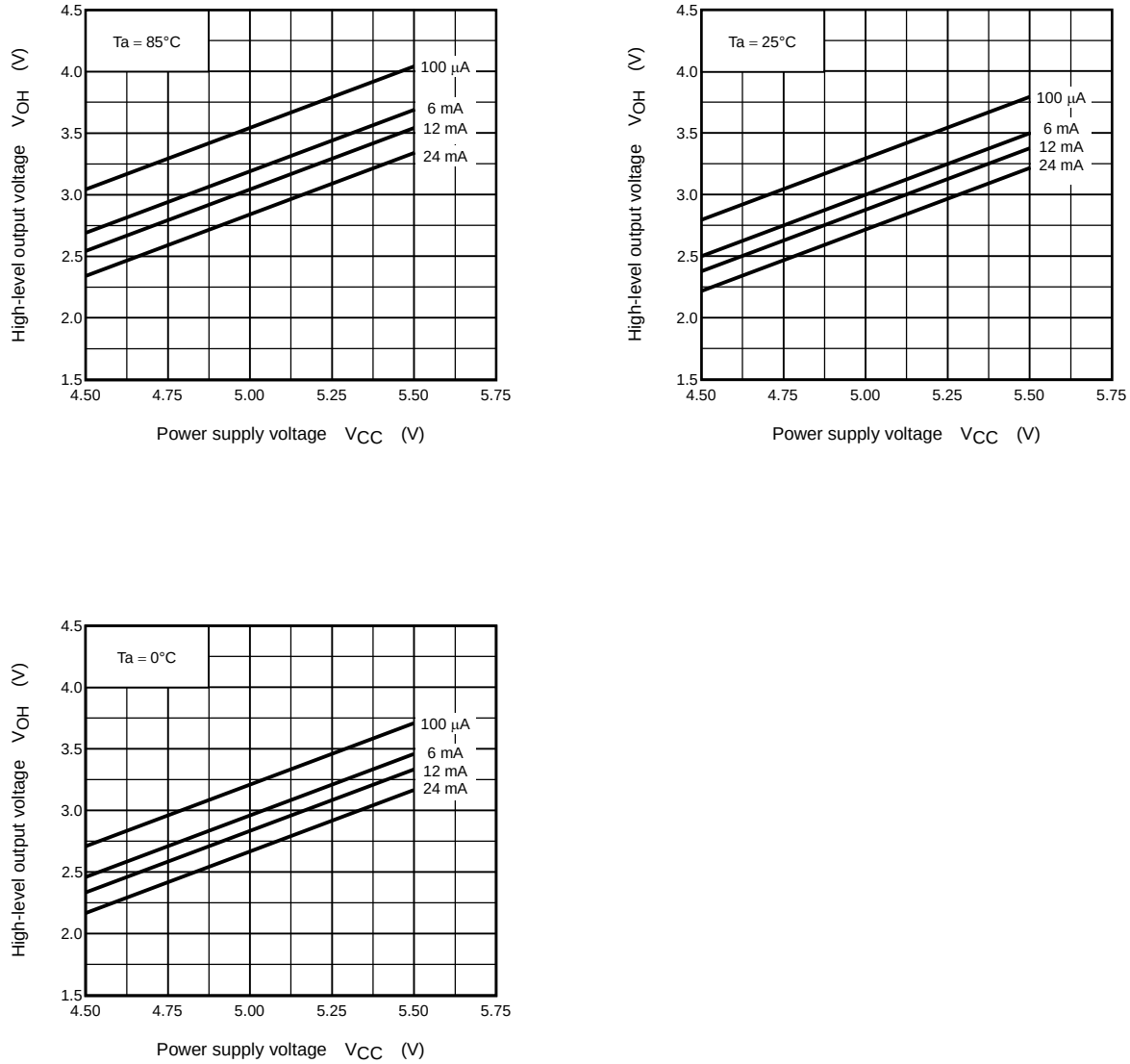
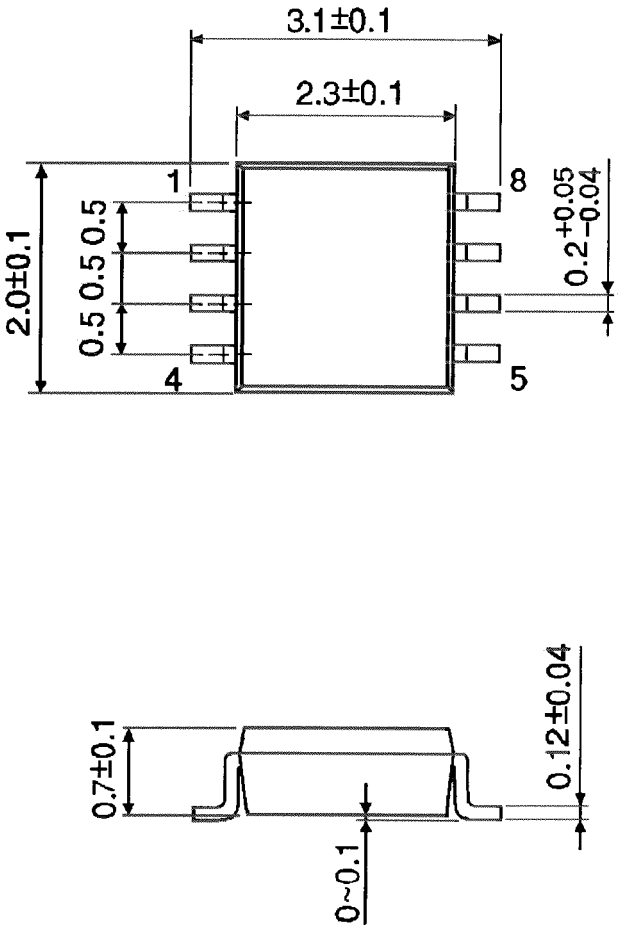


Figure 4

Package Dimensions

SSOP8-P-0.50A Unit : mm



Weight: 0.01 g (typ.)

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