TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7SB66FU

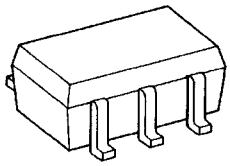
Single Bus Switch

The TC7SB66FU is a low on-resistance, high-speed CMOS 1-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.

P-MOS and N-MOS channel block means the device is suitable for analog signal transmission.

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



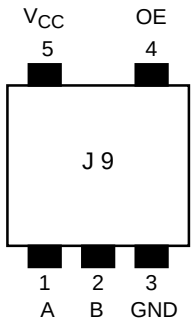
SSOP5-P-0.65A

Weight: 0.006 g (typ.)

Features

- Operating voltage: V_{CC} = 2~5.5 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)
- High noise margin: V_{NIL} = V_{NIH} = 28% V_{CC} (min)
- Power-down protection for inputs (control inputs only)
- Package: USV

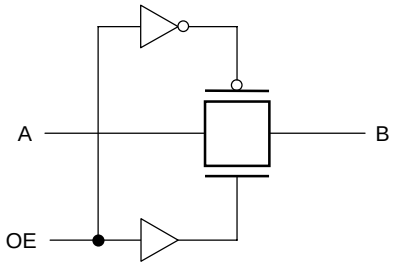
Pin Assignment (top view)



Truth Table

Inputs OE	Function
H	A port = B port
L	Disconnect

System Diagram



Maximum Ratings

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~V_{CC} + 0.5	V
Clump diode current	Control input pin	I_{IK}	−50	mA
	Switch terminal		±50	
Switch I/O 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
Power supply voltage	V_{CC}	2.0~5.5	V
Control pin input voltage	V_{IN}	0~5.5	V
Switch I/O voltage	V_S	0~V_{CC}	V
Operating temperature	T_{opr}	−40~85	°C
Control pin input rise/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 1)	Max	Unit
Control pin input voltage	"H" level	V_{IH}	—	2.0~5.5	0.7 × V_{CC}	—	—	V
	"L" level	V_{IL}	—	2.0~5.5	—	—	0.3 × V_{CC}	
Control pin input leakage current		I_{IN}	V_{IN} = 0~5.5 V	2.0~5.5	—	—	±1.0	μA
Off-state leakage current (switch off)		I_{SZ}	A, B = 0~V_{CC}, OE = GND	2.0~5.5	—	—	±1.0	μA
ON resistance (Note 2)		R_{ON}	V_{IS} = 0 V, I_{IS} = 30 mA	4.5	—	3	7	Ω
			V_{IS} = 4.5 V, I_{IS} = 30 mA	4.5	—	5	15	
			V_{IS} = 2.4 V, I_{IS} = 15 mA	4.5	—	6	12	
			V_{IS} = 0 V, I_{IS} = 24 mA	3.0	—	4	9	
			V_{IS} = 3 V, I_{IS} = 24 mA	3.0	—	7	20	
			V_{IS} = 0 V, I_{IS} = 8 mA	2.0	—	6	12	
			V_{IS} = 2 V, I_{IS} = 8 mA	2.0	—	10	30	
Quiescent supply current		I_{CC}	V_{IN} = V_{CC} or GND, I_{OUT} = 0	5.5	—	—	10	μA

Note 1: The typical values are at Ta = 25°C.

Note 2: 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_{CC} (V)	Min	Max	Unit
Propagation delay time (bus to bus)	t_{pLH} t_{pHL}	Figure 1, Figure 2 (Note 3)	2.0	—	0.5	ns
			3.3 ± 0.3	—	0.35	
			5.0 ± 0.5	—	0.25	
Output enable time	t_{pZL} t_{pZH}	Figure 1, Figure 3	2.0	—	8	ns
			3.3 ± 0.3	—	5	
			5.0 ± 0.5	—	4.5	
Output disable time	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	2.0	—	8	ns
			3.3 ± 0.3	—	6.5	
			5.0 ± 0.5	—	5	

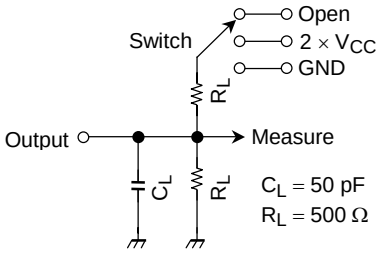
Note 3: The propagation delay time is calculated by the RC (on-resistance and load capacitance) time constant.

Capacitive Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	V_{CC} (V)	Typ.	Unit
Control pin input capacitance	C_{IN}	(Note 4)	5.0	3	pF
Switch terminal capacitance	$C_{I/O}$	OE = GND (Note 4)	5.0	10	pF

Note 4: Guaranteed by design.

AC Test Circuit



Parameter	Switch
t_{pLH}, t_{pHL}	Open
t_{pLZ}, t_{pZL}	2 × V_{CC}
t_{pHZ}, t_{pZH}	GND

Figure 1

AC Waveform

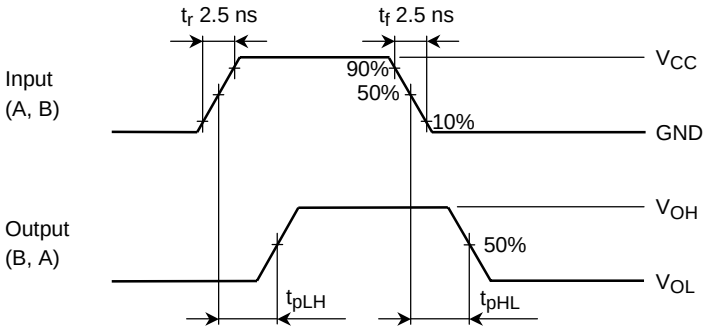


Figure 2 t_{pLH}, t_{pHL}

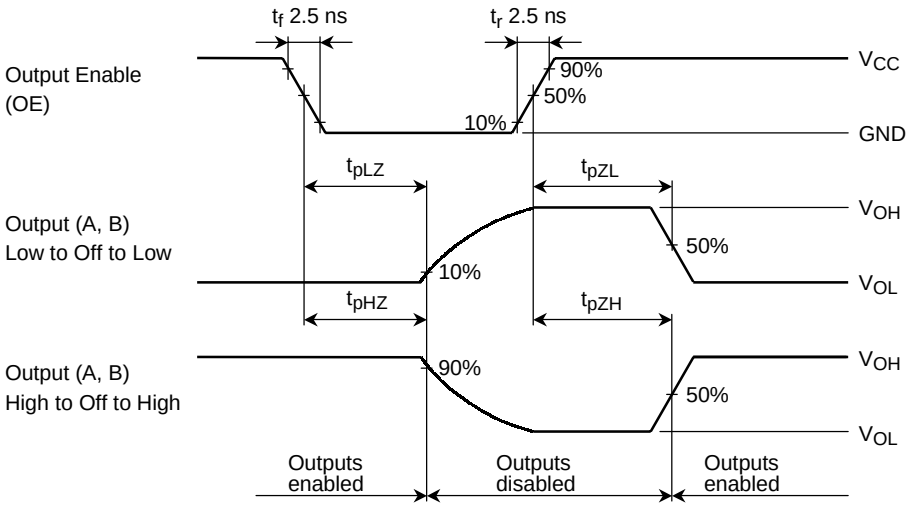
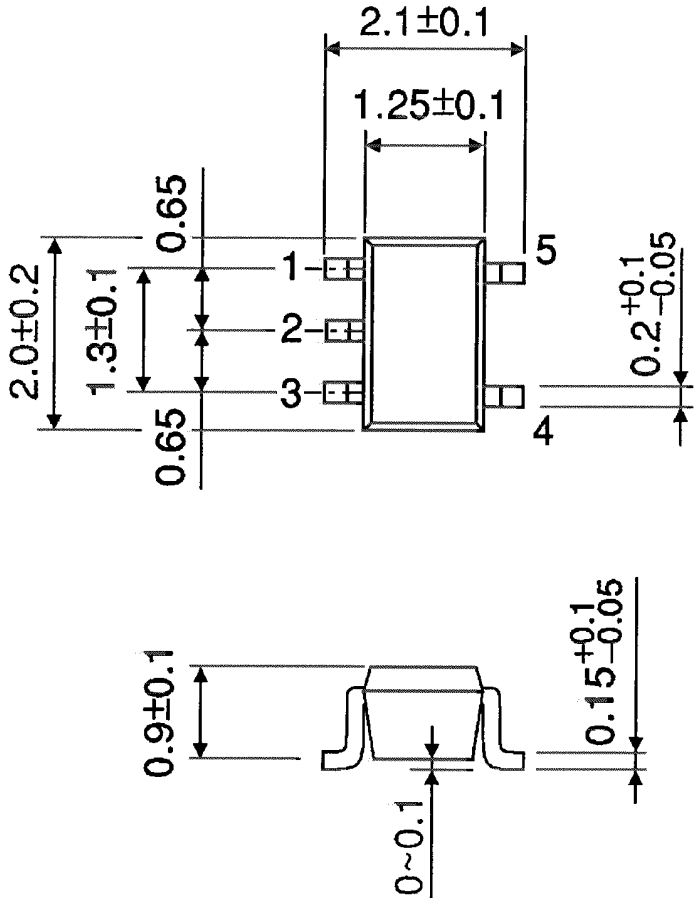


Figure 3 t_{pLZ}, t_{pHZ}, t_{pZL}, t_{pZH}

Package Dimensions

SSOP5-P-0.65A Unit : mm



Weight: 0.006 g (typ.)

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