

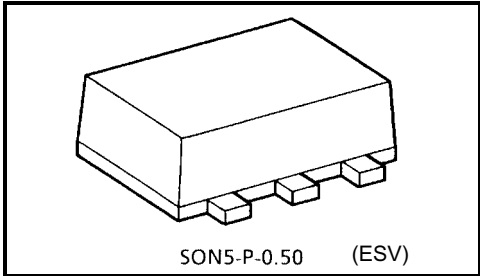
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC7SZ126AFE

Dual Bus Buffer 3-State Output

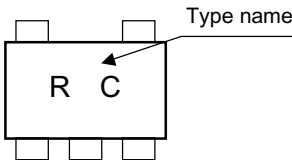
Features

- High output drive: $\pm 24\text{ mA}$ (min) @ $V_{CC} = 3\text{ V}$
- Super high speed operation: $t_{pd} 2.6\text{ ns}$ (typ.) @ $V_{CC} = 5\text{ V}$, 50 pF
- Operation voltage range: $V_{CC}(\text{opr}) = 1.8\sim 5.5\text{ V}$
- Latch-up performance: $\pm 500\text{ mA}$ or more
- ESD performance: $\pm 200\text{ V}$ or more (JEITA)
 $\pm 2000\text{ V}$ or more (MIL)
- Power down protection is provided on all inputs and outputs.
- Matches the performance of TC74LCX series when operated at $3.3\text{ V } V_{CC}$.

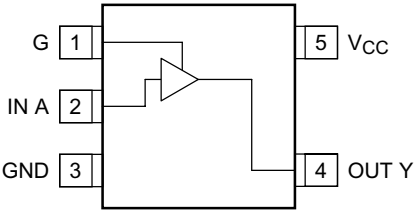


Weight: 0.003 g (typ.)

Marking



Pin Assignment (top view)



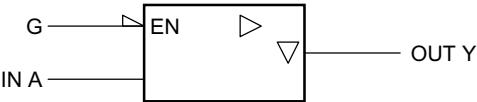
Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Power supply voltage	V_{CC}	$-0.5\sim 6$	V
DC input voltage	V_{IN}	$-0.5\sim 6$	V
DC output voltage	V_{OUT}	$-0.5\sim V_{CC} + 0.5$	V
Input diode current	I_{IK}	-20	mA
Output diode current	I_{OK}	± 20	mA
DC output current	I_{OUT}	± 50	mA
DC V_{CC} /ground current	I_{CC}	± 50	mA
Power dissipation	P_D	150	mW
Storage temperature	T_{stg}	$-65\sim 150$	$^\circ\text{C}$
Lead temperature (10s)	T_L	260	$^\circ\text{C}$

Truth Table

A	G	Y
X	L	Z
L	H	L
H	H	H

Logic Diagram



Recommended Operating Conditions

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	1.8~5.5	V
		1.5~5.5 (Note)	
Input voltage	V _{IN}	0~5.5	V
Output voltage	V _{OUT}	0~V _{CC}	V
Operating temperature	T _{opr}	−40~85	°C
Input rise and fall time	dt/dv	0~20 (V _{CC} = 1.8 V, 2.5 V ± 0.2 V)	ns/V
		0~10 (V _{CC} = 3.3 V ± 0.3 V)	
		0~5 (V _{CC} = 5.5 V ± 0.5 V)	

Note: Data retention only

Electrical Characteristics

DC Characteristics

Characteristics		Symbol	Test Condition		Ta = 25°C				Ta = -40~85°C		Unit	
					V _{CC} (V)	Min	Typ.	Max	Min	Max		
Input voltage	High level	V _{IH}	—		1.8	0.75 × V _{CC}	—	—	0.75 × V _{CC}	—	V	
					2.3~5.5	0.7 × V _{CC}	—	—	0.7 × V _{CC}	—		
	Low level	V _{IL}	—		1.8	—	—	0.25 × V _{CC}	—	0.25 × V _{CC}		
					2.3~5.5	—	—	0.3 × V _{CC}	—	0.3 × V _{CC}		
Output voltage	High level	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -100 μA	1.8	1.7	1.8	—	1.7	—	V	
					2.3	2.2	2.3	—	2.2	—		
					3.0	2.9	3.0	—	2.9	—		
					4.5	4.4	4.5	—	4.4	—		
				I _{OH} = -8 mA	2.3	1.9	2.15	—	1.9	—		
					I _{OH} = -16 mA	3.0	2.4	2.8	—	2.4		—
					I _{OH} = -24 mA	3.0	2.3	2.68	—	2.3		—
					I _{OH} = -32 mA	4.5	3.8	4.2	—	3.8		—
	Low level	V _{OL}	V _{IN} = V _{IH}	I _{OL} = 100 μA	1.8	—	0	0.1	—	0.1		
					2.3	—	0	0.1	—	0.1		
					3.0	—	0	0.1	—	0.1		
					4.5	—	0	0.1	—	0.1		
				I _{OL} = 8 mA	2.3	—	0.1	0.3	—	0.3		
					I _{OL} = 16 mA	3.0	—	0.15	0.4	—		0.4
					I _{OL} = 24 mA	3.0	—	0.22	0.55	—		0.55
					I _{OL} = 32 mA	4.5	—	0.22	0.55	—		0.55
Input leakage current		I _{IN}	V _{IN} = 5.5 V or GND	0~5.5	—	—	±1	—	±10	μA		
3-state output off-state current		I _{OZ}	V _{IN} = V _{IH} or V _{IL} , V _{OUT} = 0~5.5 V	1.8~5.5	—	—	±1	—	±10	μA		
Power off leakage current		I _{OFF}	V _{IN} or V _{OUT} = 5.5 V	0.0	—	—	1	—	10	μA		
Quiescent supply current		I _{CC}	V _{IN} = 5.5 V or GND	5.5	—	—	2	—	20	μA		

AC Characteristics (unless otherwise specified, Input: $t_r = t_f = 3$ ns)

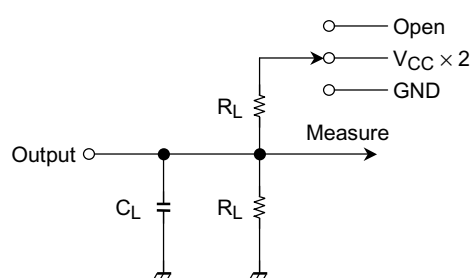
Characteristics	Symbol	Test Condition	Ta = 25°C				Ta = -40~85°C		Unit
			V _{CC} (V)	Min	Typ.	Max	Min	Max	
Propagation delay time	t _{pLH} t _{pHL}	C _L = 15 pF, R _L = 1 MΩ	1.8	2.0	5.3	11.0	2.0	11.5	ns
			2.5 ± 0.2	0.8	3.4	7.5	0.8	8.0	
			3.3 ± 0.3	0.5	2.5	5.2	0.5	5.5	
			5.0 ± 0.5	0.5	2.1	4.5	0.5	4.8	
		C _L = 50 pF, R _L = 500 Ω	3.3 ± 0.3	1.5	3.2	5.7	1.5	6.0	
			5.0 ± 0.5	0.8	2.6	5.0	0.8	5.3	
Output enable time	t _{pZH} t _{pZL}	C _L = 50 pF, R _L = 500 Ω	1.8	2.0	6.5	11.5	2.0	12.0	
			2.5 ± 0.2	1.5	3.8	8.0	1.5	8.5	
			3.3 ± 0.3	1.5	3.2	5.7	1.5	6.0	
			5.0 ± 0.5	0.8	2.3	5.0	0.8	5.3	
Output disable time	t _{pLZ} t _{pHZ}	C _L = 50 pF, R _L = 500 Ω	1.8	2.0	5.6	11.0	2.0	12.0	
			2.5 ± 0.2	1.0	4.0	8.0	1.5	8.5	
			3.3 ± 0.3	1.0	3.5	5.7	1.0	6.0	
			5.0 ± 0.5	0.5	2.7	4.7	0.5	5.0	
Input capacitance	C _{IN}	—	0~5.5	—	4	—	—	—	pF
Power dissipation capacitance	C _{PD}	(Note)	3.3	—	20	—	—	—	pF
			5.5	—	27	—	—	—	

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation:

$$I_{CC (opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

AC Characteristics Measurement Circuit

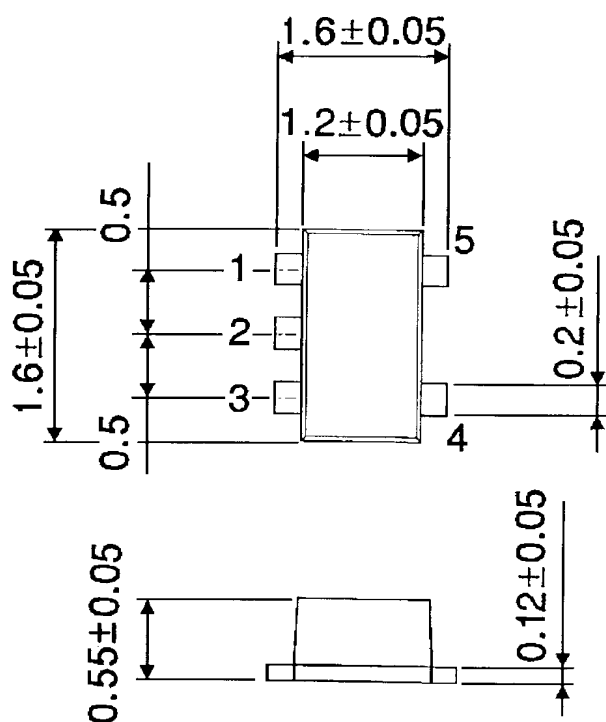


Characteristics	Switch
t_{pLH} , t_{pHL}	Open
t_{pLZ} , t_{pZL}	$V_{CC} \times 2$
t_{pHZ} , t_{pZH}	GND

Package Dimensions

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

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