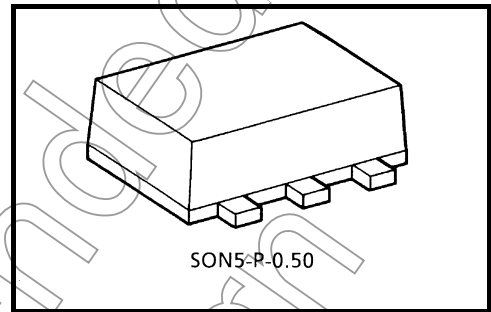


TC7SZ125AFE

Bus Buffer with 3-STATE Output

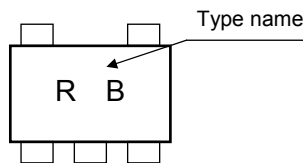
Features

- High output drive: ± 24 mA (min) at $V_{CC} = 3$ V
- Super high speed operation: t_{pd} 2.6 ns (typ.)
at $V_{CC} = 5$ V, 50pF
- Operation voltage range: $V_{CC(opr)} = 1.8\sim 5.5$ V
- 5.5-V tolerant inputs
- Matches the performance of TC74LCX series when operated at 3.3-V V_{CC} .

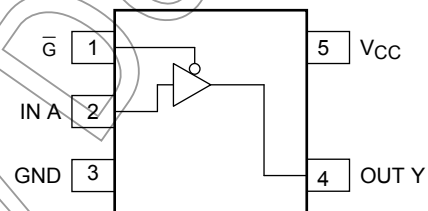


Weight: 0.003 g (typ.)

Marking



Pin Assignment (top view)



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

Characteristics	Symbol	Rating	Unit
Power supply voltage	V_{CC}	-0.5~6	V
DC input voltage	V_{IN}	-0.5~6	V
DC output voltage	V_{OUT}	-0.5~ $V_{CC} + 0.5$	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}	-65~150	$^\circ\text{C}$
Lead temperature (10s)	T_L	260	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

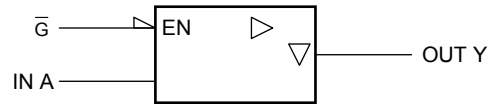
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Truth Table

A	\bar{G}	Y
X	H	Z
L	L	L
H	L	H

X : Don't Care
Z : High Impedance

Logic Diagram



Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	1.8~5.5	V
		1.5~5.5 (Note 1)	
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 ($V_{CC} = 1.8\text{ V}, 2.5\text{ V} \pm 0.2\text{ V}$)	ns/V
		0~10 ($V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$)	
		0~5 ($V_{CC} = 5.5\text{ V} \pm 0.5\text{ V}$)	

Note1 : Data retention only

Not Recommended for New Design

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	—	
					3.0	2.4	2.8	—	2.4	—	
					3.0	2.3	2.68	—	2.3	—	
					4.5	3.8	4.2	—	3.8	—	
	Low level	V _{OL}	V _{IN} = V _{IL}	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	
					3.0	—	0.15	0.4	—	0.4	
3.0					—	0.22	0.55	—	0.55		
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		
Quiescent supply current	I _{CC}	V _{IN} = 5.5 V or GND	5.5	—	—	2	—	20	μA		

Not for

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

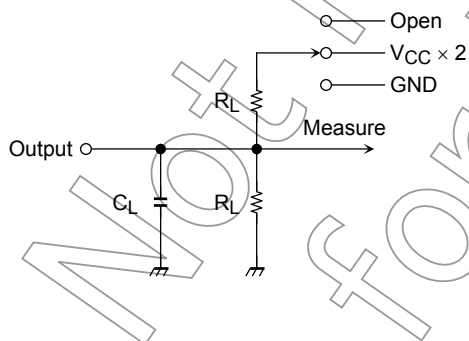
Characteristics	Symbol	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit	
			V _{CC} (V)	Min	Typ.	Max	Min		Max
Propagation delay time	t_{pLH} t_{pHL}	$C_L = 15$ pF, $R_L = 1$ M Ω	1.8	2.0	5.3	11.0	2.0	11.5	ns
			2.5 ± 0.2	0.8	3.4	7.5	0.8	8.0	
			3.3 ± 0.3	0.5	2.5	5.2	0.5	5.5	
		$C_L = 50$ pF, $R_L = 500$ Ω	5.0 ± 0.5	0.5	2.1	4.5	0.5	4.8	
			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_{pZL} t_{pZH}	$C_L = 50$ pF, $R_L = 500$ Ω	1.8	2.0	7.0	12.5	2.0	13.0	ns
			2.5 ± 0.2	1.5	4.6	8.5	1.5	9.0	
			3.3 ± 0.3	1.5	3.5	6.2	1.5	6.5	
			5.0 ± 0.5	0.8	2.8	5.5	0.8	5.8	
Output disable time	t_{pLZ} t_{pHZ}	$C_L = 50$ pF, $R_L = 500$ Ω	1.8	2.0	5.4	11.0	2.0	12.0	ns
			2.5 ± 0.2	1.5	3.5	8.0	1.5	8.5	
			3.3 ± 0.3	1.0	2.8	5.7	1.0	6.0	
			5.0 ± 0.5	0.5	2.1	4.7	0.5	5.0	
Input capacitance	C _{IN}	—	0~5.5	—	4	—	—	pF	
Power dissipation capacitance	C _{PD}	(Note 2)	3.3	—	20	—	—	—	pF
			5.5	—	27	—	—	—	

Note2: 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

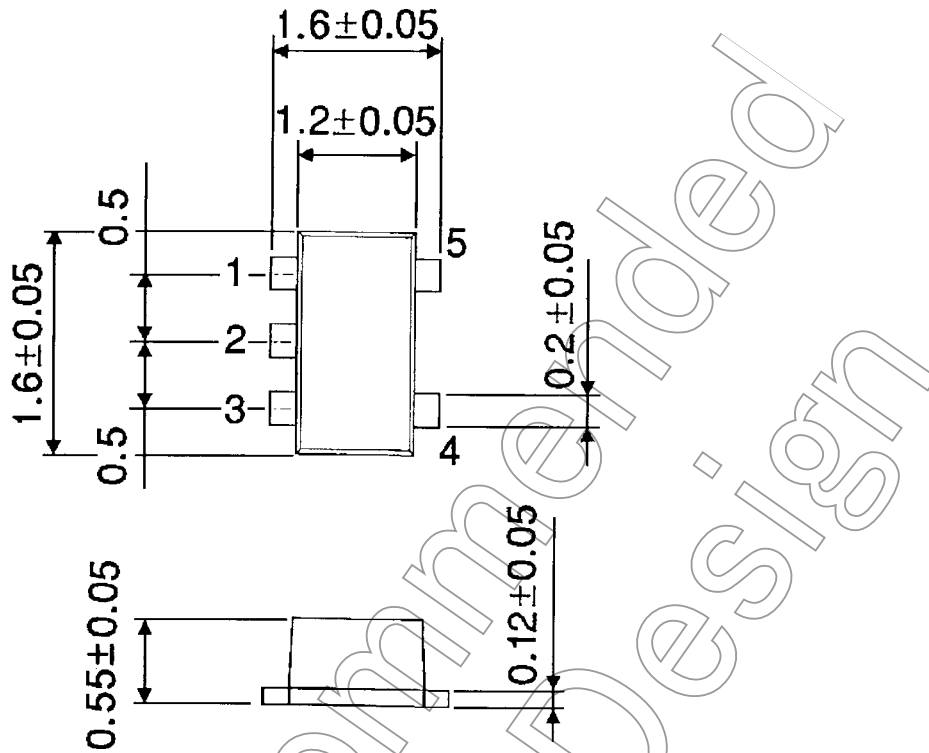


Characteristics	Switch
t_{pLH} , t_{pHL}	Open
t_{pLZ} , t_{pZL}	$V_{CC} \times 2$
t_{pHZ} , t_{pZH}	GND

Package Dimensions

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

Not Recommended for New Design

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