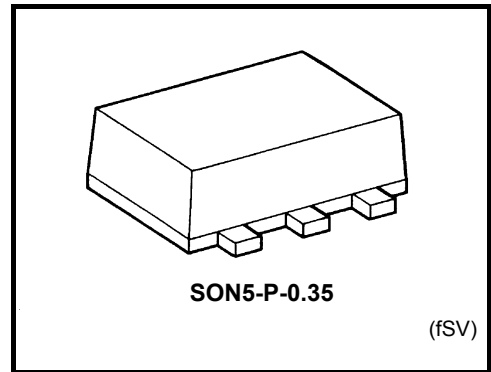


TC7SH126FS

Bus Buffer with 3-STATE Output

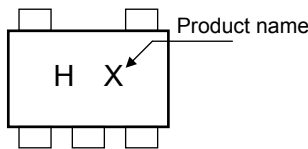
Features

- High speed: $t_{pd} = 3.8 \text{ ns (typ.)}$ at $V_{CC} = 5 \text{ V}$, 15pF
- Low power dissipation: $I_{CC} = 2 \mu\text{A (max)}$ at $T_a = 25^\circ\text{C}$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\% V_{CC} \text{ (min)}$
- Wide operating voltage range: $V_{CC} \text{ (opr.)} = 2\sim 5.5 \text{ V}$
- 5.5-V tolerant input

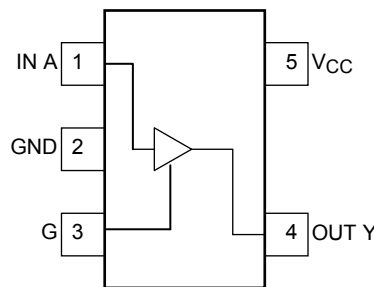


Weight: 0.001 g (typ.)

Marking



Pin Assignment (top view)



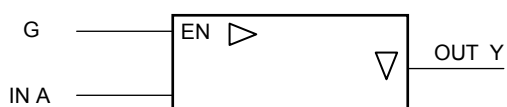
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	$-0.5\sim 7$	V
DC input voltage	V_{IN}	$-0.5\sim 7$	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}	± 25	mA
DC V_{CC} /ground current	I_{CC}	± 50	mA
Power dissipation	P_D	50	mW
Storage temperature	T_{stg}	$-65\sim 150$	$^\circ\text{C}$

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).

IEC Logic Symbol



Truth Table

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

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	2.0~5.5	V
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	0~100 ($V_{CC} = 3.3 V \pm 0.3 V$)	ns/V
		0~20 ($V_{CC} = 5 V \pm 0.5 V$)	

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40~85°C		Unit	
				V _{CC} (V)	Min	Typ.	Max	Min		Max
High-level input voltage	V _{IH}	—		2.0	1.5	—	—	1.5	—	V
				3.0~5.5	V _{CC} × 0.7	—	—	V _{CC} × 0.7	—	
Low-level input voltage	V _{IL}	—		2.0	—	—	0.5	—	0.5	V
				3.0~5.5	—	—	V _{CC} × 0.3	—	V _{CC} × 0.3	
High-level output voltage	V _{OH}	V _{IN} = V _{IH}	I _{OH} = -50 μA	2.0	1.9	2.0	—	1.9	—	V
				3.0	2.9	3.0	—	2.9	—	
			I _{OH} = -4 mA	3.0	2.58	—	—	2.48	—	
				4.5	3.94	—	—	3.80	—	
Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 50 μA	2.0	—	0	0.1	—	0.1	V
				3.0	—	0	0.1	—	0.1	
				4.5	—	0	0.1	—	0.1	
			I _{OL} = 4 mA	3.0	—	—	0.36	—	0.44	
				4.5	—	—	0.36	—	0.44	
3-state output off-state current	I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC} or GND	5.5	—	—	±0.25	—	±2.5	μA	
Input leakage current	I _{IN}	V _{IN} = 5.5 V or GND	0~5.5	—	—	±0.1	—	±1.0	μA	
Quiescent supply current	I _{CC}	V _{IN} = V _{CC} or GND	5.5	—	—	2.0	—	20	μA	

AC Characteristics (Input: $t_r = t_f = 3 \text{ ns}$)

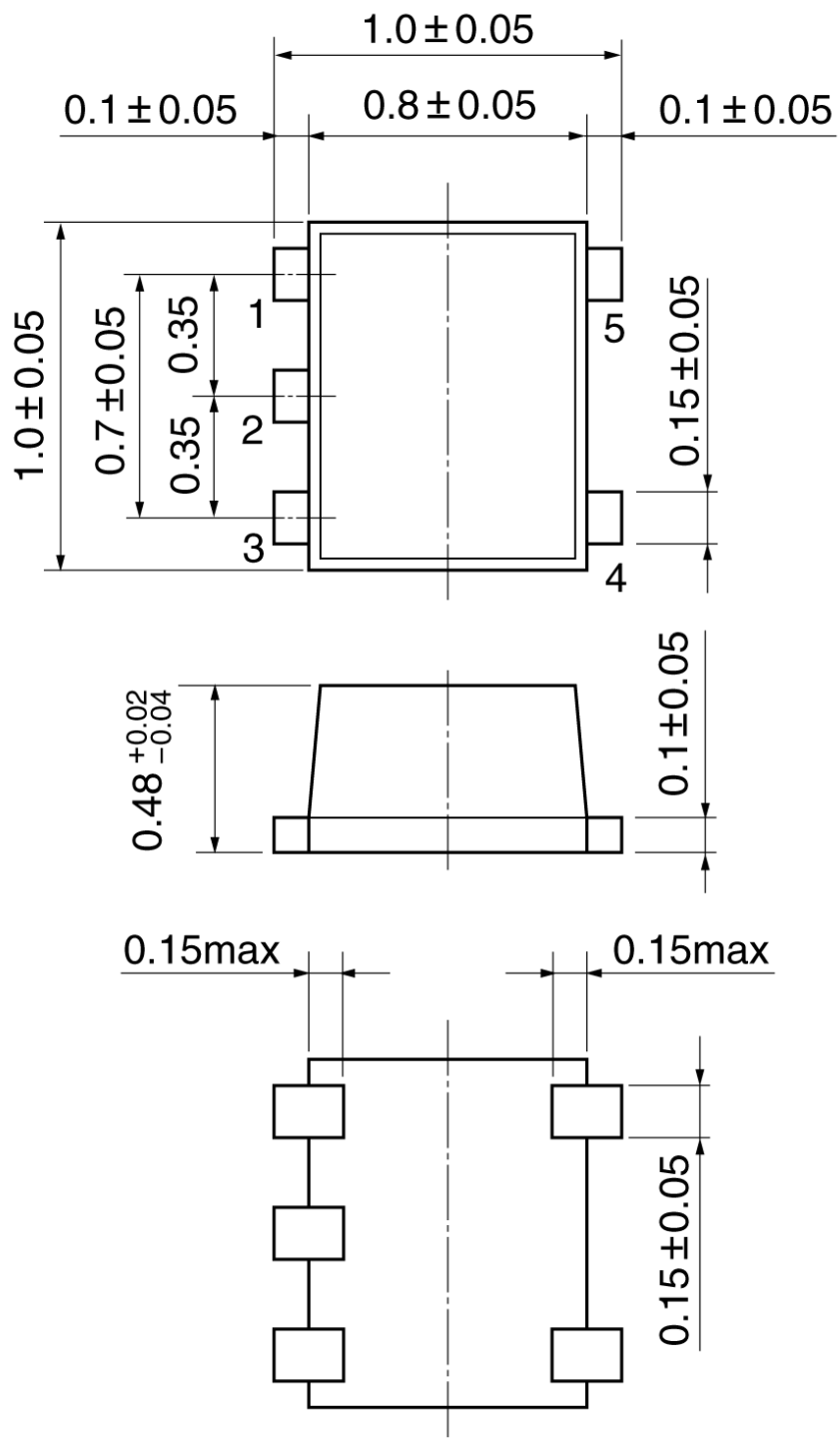
Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40~85°C		Unit	
		V _{CC} (V)	C _L (pF)	Min	Typ.	Max	Min	Max		
Propagation delay time	t _{pLH}	—	3.3 ± 0.3	15	—	5.6	8.0	1.0	9.5	ns
				50	—	8.1	11.5	1.0	13.0	
	5.0 ± 0.5		15	—	3.8	5.5	1.0	6.5		
			50	—	5.3	7.5	1.0	8.5		
3-state output enable time	t _{pZL}	—	3.3 ± 0.3	15	—	5.4	8.0	1.0	9.5	ns
				50	—	7.9	11.5	1.0	13.0	
	5.0 ± 0.5		15	—	3.6	5.1	1.0	6.0		
			50	—	5.1	7.1	1.0	8.0		
3-state output disable time	t _{pLZ}	—	3.3 ± 0.3	50	—	9.5	13.2	1.0	15.0	ns
	t _{pHZ}		5.0 ± 0.5	50	—	6.1	8.8	1.0	10.0	
Input capacitance	C _{IN}	—		—	4	10	—	10	pF	
Output capacitance	C _{OUT}	—		—	6	—	—	—	pF	
Power dissipation capacitance	C _{PD}	(Note)		—	15	—	—	—	pF	

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:

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

Package Dimensions



Weight: 0.001 g (typ.)

RESTRICTIONS ON PRODUCT USE

20070701-EN GENERAL

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