

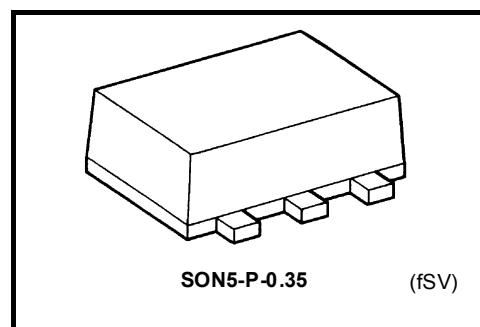
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC7SZ126AFS

Bus Buffer 3-State Output

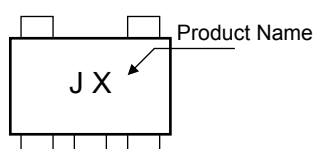
Features

- High output current : $\pm 24\text{mA}$ (min) at $V_{CC} = 3\text{V}$
- Super high speed operation : $t_{pd} = 2.6\text{ ns}$ (typ.)
at $V_{CC} = 5\text{ V}$, $C_L = 50\text{ pF}$
- Operation voltage range : $V_{CC} = 1.65\text{ to }5.5\text{V}$
- 5.5-V tolerant input
- ESD performance : Machine model $\geq \pm 200\text{ V}$
Human body model $\geq \pm 2000\text{ V}$

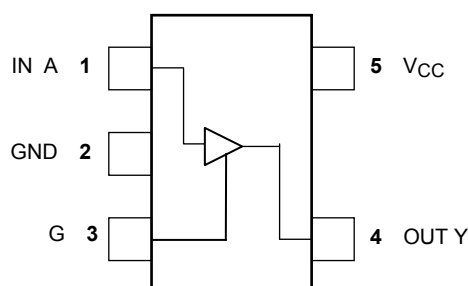


Weight: 0.001 g (typ.)

Marking



Pin Assignment (top view)



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

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	-0.5 to 6	V
DC input voltage	V_{IN}	-0.5 to 6	V
DC output voltage	V_{OUT}	-0.5 to $V_{CC}+0.5$	V
Input diode current	I_{IK}	-20	mA
Output diode current	I_{OK}	± 20 (Note1)	mA
DC output current	I_{OUT}	± 50	mA
DC V_{CC} /ground current	I_{CC}	± 50	mA
Power dissipation	P_D	50	mW
Storage temperature	T_{stg}	-65 to 150	$^\circ\text{C}$

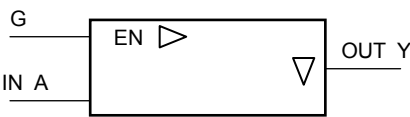
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Note 1: $V_{OUT} < \text{GND}$, $V_{OUT} > V_{CC}$

Start of commercial production
2008-05

IEC Logic Symbol



Truth Table

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

X: Don't Care
Z: High Impedance

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	1.65 to 5.5	V
		1.5 to 5.5 (Note 2)	
Input voltage	V _{IN}	0 to 5.5	V
Output voltage	V _{OUT}	0 to V _{CC}	V
Operating temperature	T _{opr}	−40 to 85	°C
Input rise time and fall time	dt/dv	0 to 20 (V _{CC} = 1.80 V ± 0.15V, 2.5 V ± 0.2 V)	ns/V
		0 to 10 (V _{CC} = 3.3 V ± 0.3 V)	
		0 to 5 (V _{CC} = 5.0 V ± 0.5 V)	

Note 2: Data retention only

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40 to 85°C		Unit
				V _{CC} (V)	Min	Typ.	Max	Min	
High-level input voltage	V _{IH}	—		1.65 to 1.95	V _{CC} × 0.75	—	—	V _{CC} × 0.75	V
				2.3 to 5.5	V _{CC} × 0.7	—	—	V _{CC} × 0.7	
Low-level input voltage	V _{IL}	—		1.65 to 1.95	—	—	V _{CC} × 0.25	—	V
				2.3 to 5.5	—	—	V _{CC} × 0.3	—	
High-level output voltage	V _{OH}	V _{IN} = V _{IH}	I _{OH} = -100 μA	1.65	1.55	1.65	—	1.55	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} = -4 mA	1.65	1.29	1.52	—	1.29	
			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	
Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 100 μA	1.65	—	0	0.1	—	V
				2.3	—	0	0.1	—	
				3.0	—	0	0.1	—	
				4.5	—	0	0.1	—	
			I _{OL} = 4 mA	1.65	—	0.08	0.24	—	
			I _{OL} = 8 mA	2.3	—	0.1	0.3	—	
			I _{OL} = 16 mA	3.0	—	0.15	0.4	—	
			I _{OL} = 24 mA	3.0	—	0.22	0.55	—	
			I _{OL} = 32 mA	4.5	—	0.22	0.55	—	
3-state output off-state current	I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = 0 to 5.5V		1.65 to 5.5	—	—	±1	—	μA
Input leakage current	I _{IN}	V _{IN} = 5.5 V or GND		0 to 5.5	—	—	±1	—	μA
Quiescent supply current	I _{CC}	V _{IN} = 5.5 V or GND		5.5	—	—	2	—	μA

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

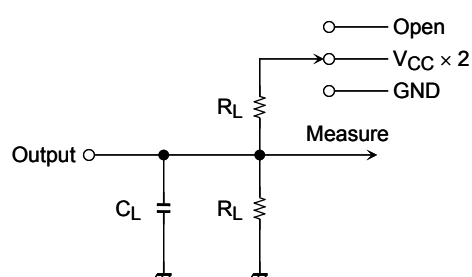
Characteristics	Symbol	Test Condition	Ta = 25°C			Ta = -40 to 85°C		Unit
			V _{CC} (V)	Min	Typ.	Max	Min	Max
Propagation delay time	t_{pLH} t_{pHL}	$C_L = 15$ pF, $R_L = 1$ M Ω	1.8 ± 0.15	2.0	5.3	13.0	2.0	13.5
			2.5 ± 0.2	0.8	3.4	7.5	0.8	8.0
			3.3 ± 0.3	0.5	2.5	5.2	0.5	5.5
			5.0 ± 0.5	0.5	2.1	4.5	0.5	4.8
		$C_L = 50$ pF, $R_L = 500\Omega$	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, $R_L = 500\Omega$	1.8 ± 0.15	2.0	8.0	14.5	2.0	15.0
			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, $R_L = 500\Omega$	1.8 ± 0.15	2.0	7.0	13.0	2.0	13.5
			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 to 5.5	—	4	—	—	pF
Output capacitance	C _{OUT}	—	0 to 5.5	—	4	—	—	pF
Power dissipation capacitance	C _{PD}	(Note 3)	3.3	—	12	—	—	pF
			5.5	—	22	—	—	

Note 3: 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

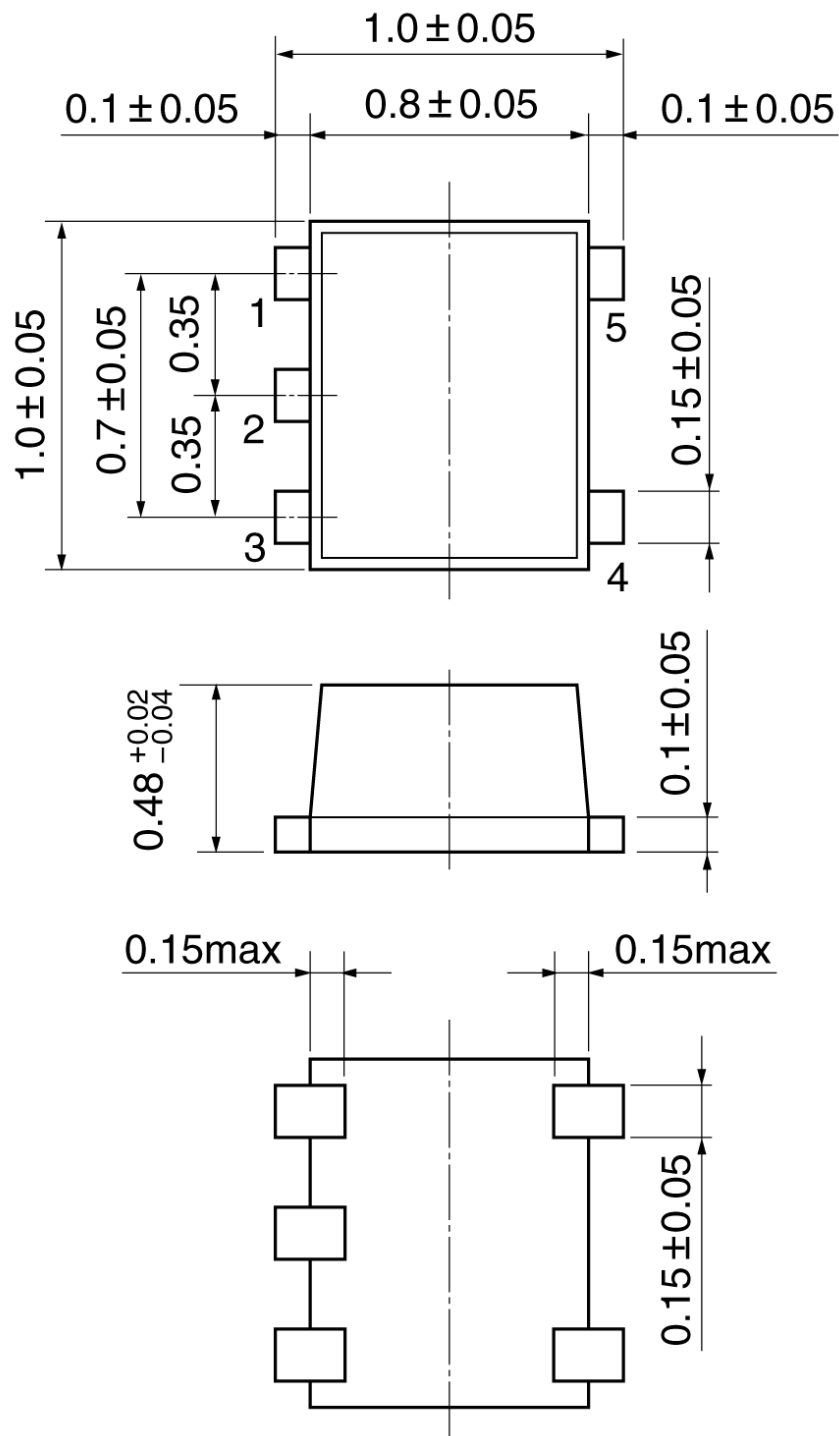


Characteristics	Switch
t_{pLH} , t_{pHL}	Open
t_{pLZ} , t_{pZL}	V _{CC} × 2
t_{pHZ} , t_{pZH}	GND

Package Dimensions

SON5-P-0.35

Unit: mm



Weight: 0.001 g (typ.)

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