

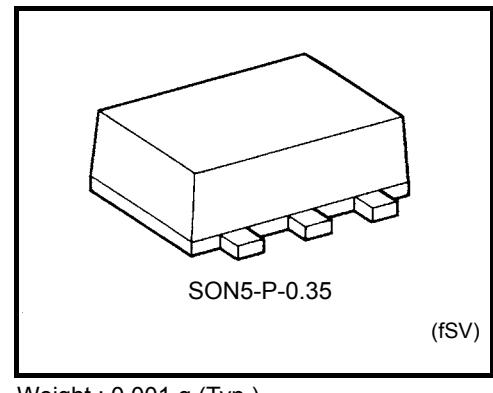
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC7SH125FS

Bus Buffer

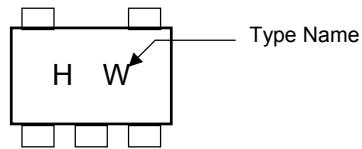
Features

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

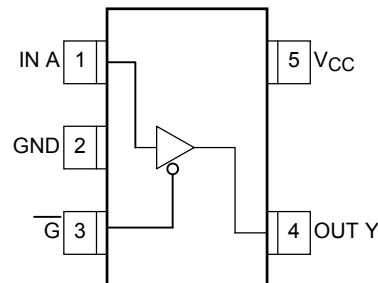


Weight : 0.001 g (Typ.)

Marking



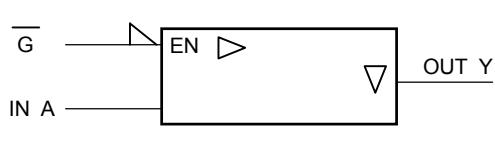
Pin Assignment (top view)



Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V _{CC}	-0.5~7.0	V
DC input voltage	V _{IN}	-0.5~7.0	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}	±25	mA
DC V _{CC} /ground current	I _{CC}	±50	mA
Power dissipation	P _D	50	mW
Storage temperature	T _{stg}	-65~150	°C

Logic Diagram



Truth Table

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

Recommended Operating Conditions

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 ± 0.3 V) 0~20 (V _{CC} = 5 ± 0.5 V)	ns/V

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Circuit	Test Condition	V _{CC} (V)	Ta = 25°C			Ta = -40~85°C		Unit
					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	—	—	0.50	—	0.50	V
				3.0~5.5	—	—	V _{CC} × 0.3	—	V _{CC} × 0.3	
High-level output voltage	V _{OH}	—	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -50 μA	2.0	1.9	2.0	—	1.9	V
					3.0	2.9	3.0	—	2.9	
					4.5	4.4	4.5	—	4.4	
				I _{OH} = -4 mA	3.0	2.58	—	—	2.48	
				I _{OH} = -8 mA	4.5	3.94	—	—	3.80	
Low-level output voltage	V _{OL}	—	V _{IN} = V _{IH}	I _{OL} = 50 μA	2.0	—	0	0.1	—	V
					3.0	—	0	0.1	—	
					4.5	—	0	0.1	—	
				I _{OL} = 4 mA	3.0	—	—	0.36	—	0.44
				I _{OL} = 8 mA	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	—	20.0	μA

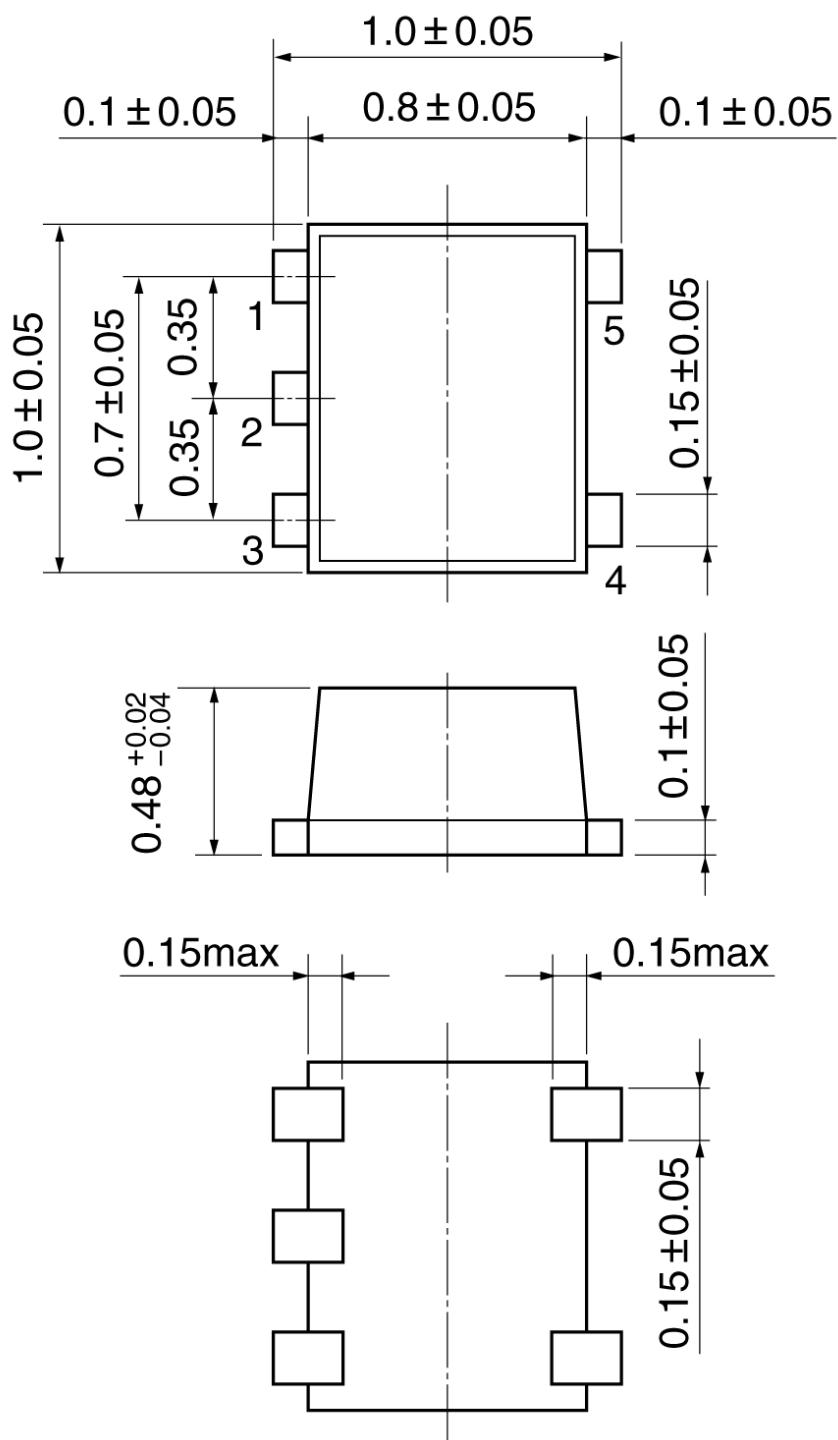
AC Characteristics (Input: $t_r = t_f = 3$ ns)

Characteristics	Symbol	Test Circuit	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		
					50	—	8.1	11.5	1.0	13.0		
	t _{pHL}			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		
					50	—	7.9	11.5	1.0	13.0		
	t _{pZH}			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		
	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)			—	14	—	—	—	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:

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

Package Dimensions

Weight: 0.001 g (typ.)

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