

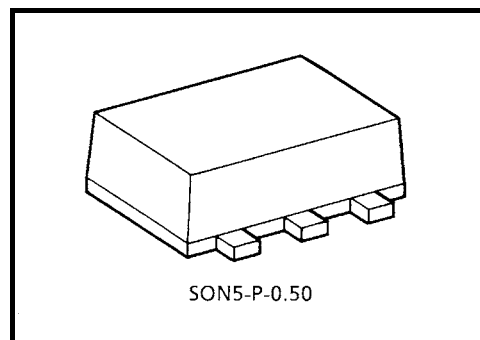
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC7SH125FE

Bus Buffer

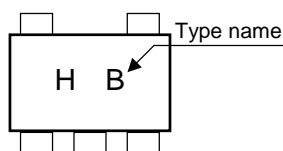
Features

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

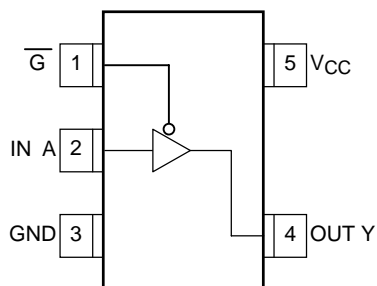


Weight: 0.003 g (typ.)

Marking



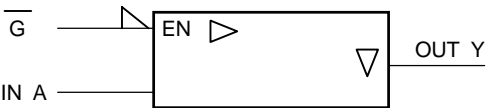
Pin Assignment (top view)



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	150	mW
Storage temperature	T_{stg}	$-65\sim 150$	$^\circ\text{C}$

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}	2~5.5	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 ($V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$)	ns/V
		0~20 ($V_{CC} = 5\text{ V} \pm 0.5\text{ V}$)	

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	—	—	0.5	—	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	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} 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		
					I _{OL} = 8 mA	4.5	—	—	0.36	—		0.44
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: $t_r = t_f = 3 \text{ ns}$)

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} t_{pHL}	—	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} t_{pZH}	—	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} t_{pHZ}	—	3.3 ± 0.3	50	—	9.5	13.2	1.0	15.0	ns
			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.

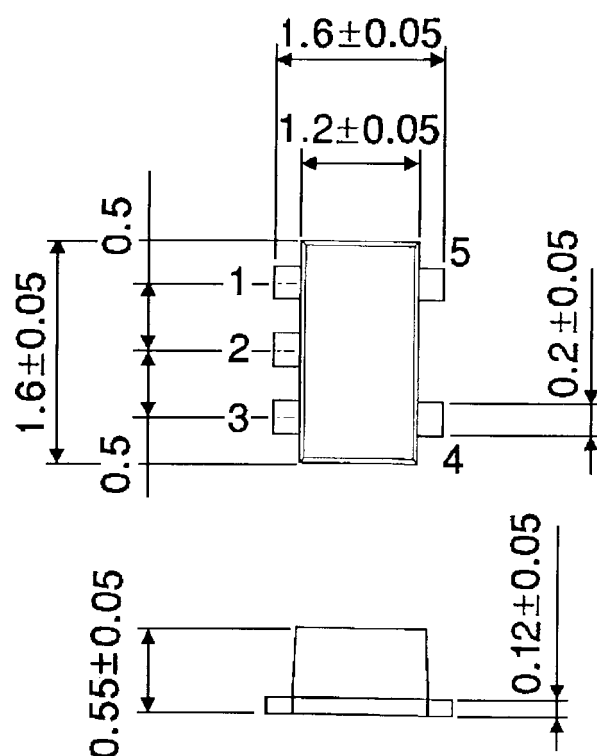
Average operating current can be obtained by the equation.

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

Package Dimensions

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

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