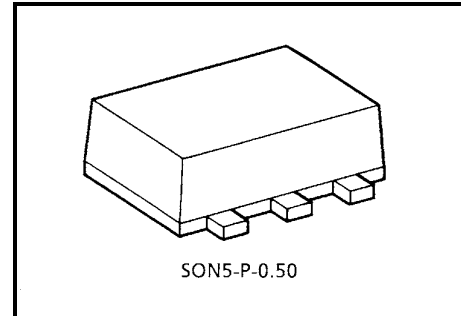


TC7SH125FE

Bus Buffer

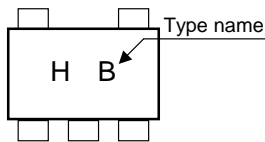
Features

- 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: $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (min)
- 5.5V tolerant input.
- Wide operating voltage range: $V_{CC} \text{ (opr)} = 2\text{--}5.5 \text{ V}$

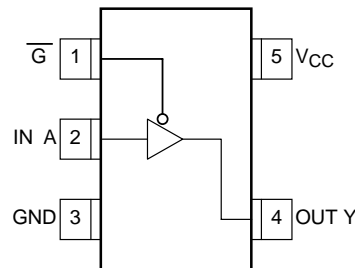


Weight: 0.003 g (typ.)

Marking



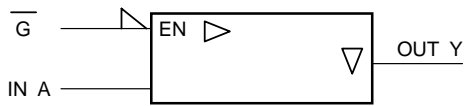
Pin Assignment (top view)



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

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5~7	V
DC input voltage	V_{IN}	-0.5~7	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	150	mW
Storage temperature	T_{stg}	-65~150	$^\circ\text{C}$

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

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Circuit	Test Condition	$T_a = 25^\circ\text{C}$			$T_a = -40\sim 85^\circ\text{C}$		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	$V_{CC} \times 0.7$	—	—	$V_{CC} \times 0.7$	—		
Low-level input voltage	V_{IL}	—	—	2.0	—	—	0.5	—	0.5	V	
				3.0~5.5	—	—	$V_{CC} \times 0.3$	—	$V_{CC} \times 0.3$		
High-level output voltage	V_{OH}	—	$V_{IN} = V_{IH}$	$I_{OH} = -50 \mu\text{A}$	2.0	1.9	2.0	—	1.9	—	V
					3.0	2.9	3.0	—	2.9	—	
				$I_{OH} = -4 \text{ mA}$	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}	$I_{OL} = 50 \mu\text{A}$	2.0	—	0	0.1	—	0.1	V
					3.0	—	0	0.1	—	0.1	
				$I_{OL} = 4 \text{ mA}$	3.0	—	—	0.36	—	0.44	
					4.5	—	—	0.36	—	0.44	
Input leakage current	I_{IN}	—	$V_{IN} = 5.5 \text{ V or GND}$	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}	—	—	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)		—	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.

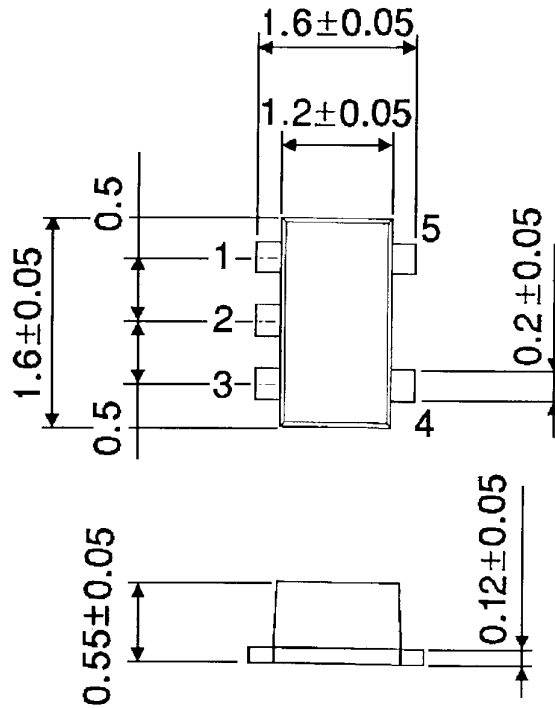
Average operating current can be obtained by the equation.

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

Package Dimensions

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

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