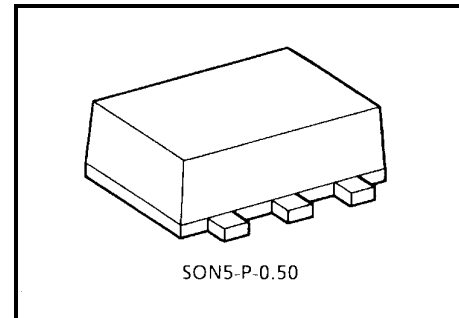


TC7SZ02AFE

2 Input NOR Gate

Features

- High output drive: ± 24 mA (typ.)
@VCC = 3 V
- Super high speed operation: tPD 2.4 ns (typ.)
@VCC = 5 V, 50 pF
- Operation voltage range: VCC (opr) = 1.8~5.5 V
- Supply voltage data retention: VCC = 1.5~5.5 V
- Latch-up performance: ± 500 mA
- ESD performance: Human body model > ± 2000 V
Machine model > ± 200 V
- Power down protection is provided on all inputs.
- Matches the performance of TC74LCX series when operated at 3.3 V VCC
- Input rise and fall time (tr, tf) (recommended operation condition)
 - @VCC = 1.8 V, 2.5 V ± 0.2 V: 0~20 ns/V
 - @VCC = 3.3 V ± 0.3 V: 0~10 ns/V
 - @VCC = 5.5 V ± 0.5 V: 0~5 ns/V



Weight: 0.003 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	VCC	-0.5~6	V
DC input voltage	VIN	-0.5~6	V
DC output voltage	VOU	-0.5~VCC + 0.5	V
Input diode current	I _{IK}	± 20	mA
Output diode current	I _{OK}	± 20	mA
DC output current	I _{OUT}	± 50	mA
DC VCC/ground current	I _{CC}	± 50	mA
Power dissipation	P _D	150	mW
Storage temperature	T _{stg}	-65~150	°C
Lead temperature (10 s)	T _L	260	°C

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Circuit	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit		
				V _{CC} (V)	Min	Typ.	Max	Min		Max	
High-level input voltage	V _{IH}	—	—	1.8	0.75 × V _{CC}	—	—	0.75 × V _{CC}	—	V	
				2.3-5.5	0.7 × V _{CC}	—	—	0.7 × V _{CC}	—		
Low-level input voltage	V _{IL}	—	—	1.8	—	—	0.25 × V _{CC}	—	0.25 × V _{CC}	V	
				2.3-5.5	—	—	0.3 × V _{CC}	—	0.3 × V _{CC}		
High-level output voltage	V _{OH}	—	V _{IN} = V _{IL}	I _{OH} = -100 μA	1.8	1.7	1.8	—	1.7	—	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} = -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	1.8	—	0	0.1	—	0.1	V
					2.3	—	0	0.1	—	0.1	
					3.0	—	0	0.1	—	0.1	
					4.5	—	0	0.1	—	0.1	
				I _{OL} = 8 mA	2.3	—	0.1	0.3	—	0.3	
				I _{OL} = 16 mA	3.0	—	0.15	0.4	—	0.4	
				I _{OL} = 24 mA	3.0	—	0.22	0.55	—	0.55	
Input leakage current	I _{IN}	—	V _{IN} = 5.5 V or GND	0-5.5	—	—	±1	—	±10	μA	
				5.5	—	—	2	—	20		
Quiescent supply current	I _{CC}	—	V _{IN} = V _{CC} or GND	5.5	—	—	2	—	20	μA	

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

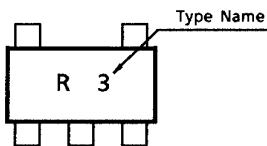
Characteristics	Symbol	Test Circuit	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit	
				V _{CC} (V)	Min	Typ.	Max	Min		Max
Propagation delay time	t _{PLH}	—	C _L = 15 pF, R _L = 1 MΩ	1.8	2.0	4.4	9.5	2.0	10.0	ns
				2.5 ± 0.2	0.8	2.9	6.5	0.8	7.0	
	3.3 ± 0.3			0.5	2.3	4.5	0.5	4.7		
	5.0 ± 0.5			0.5	1.9	3.9	0.5	4.1		
	t _{PHL}		C _L = 50 pF, R _L = 500 Ω	3.3 ± 0.3	1.5	2.9	5.0	1.5	5.2	
				5.0 ± 0.5	0.8	2.4	4.3	0.8	4.5	
Input capacitance	C _{IN}	—	—	0.5-5.5	—	4	—	—	pF	
Power dissipation capacitance	C _{PD}	—	(Note)	3.3	—	19	—	—	—	pF
				5.5	—	27	—	—	—	

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

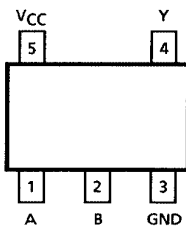
Average operating current can be obtained by the equation.

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

Marking



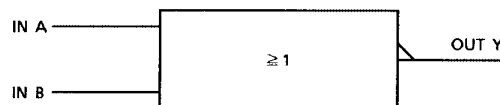
Pin Assignment (top view)



Truth Table

A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

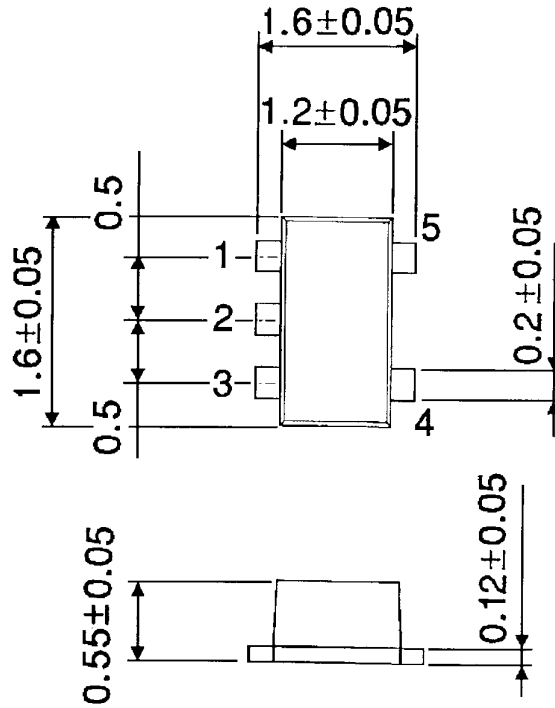
Logic Diagram



Package Dimensions

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

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000707EBA

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