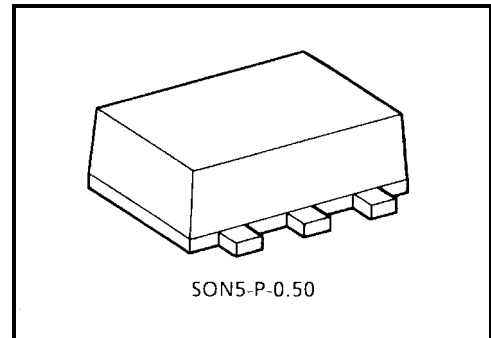


# TC7SZ08AFE

## 2 Input AND Gate

### Features

- High output drive:  $\pm 24$  mA (typ.)  
@VCC = 3 V
- Super high speed operation: tPD 2.7 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:  $\pm 500$  mA
- ESD performance: Human body model  $> \pm 2000$  V  
Machine model  $> \pm 200$  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  $\pm 0.2$  V: 0~20 ns/V  
@VCC = 3.3 V  $\pm 0.3$  V: 0~10 ns/V  
@VCC = 5.5 V  $\pm 0.5$  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	VOUT	-0.5~VCC + 0.5	V
Input diode current	I <sub>IK</sub>	$\pm 20$	mA
Output diode current	I <sub>OK</sub>	$\pm 20$	mA
DC output current	I <sub>OUT</sub>	$\pm 50$	mA
DC VCC/ground current	I <sub>CC</sub>	$\pm 50$	mA
Power dissipation	P <sub>D</sub>	150	mW
Storage temperature	T <sub>stg</sub>	-65~150	°C
Lead temperature (10 s)	T <sub>L</sub>	260	°C

## Electrical Characteristics

### DC Characteristics

Characteristics	Symbol	Test Circuit	Test Condition	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40~85°C		Unit	
					Min	Typ.	Max	Min	Max		
High-level input voltage	V <sub>IH</sub>	—	—	1.8	0.75 × V <sub>CC</sub>	—	—	0.75 × V <sub>CC</sub>	—	V	
				2.3-5.5	0.7 × V <sub>CC</sub>	—	—	0.7 × V <sub>CC</sub>	—		
Low-level input voltage	V <sub>IL</sub>	—	—	1.8	—	—	0.25 × V <sub>CC</sub>	—	0.25 × V <sub>CC</sub>	V	
				2.3-5.5	—	—	0.3 × V <sub>CC</sub>	—	0.3 × V <sub>CC</sub>		
High-level output voltage	V <sub>OH</sub>	—	V <sub>IN</sub> = V <sub>IH</sub>	I <sub>OH</sub> = -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 <sub>OH</sub> = -8 mA	2.3	1.9	2.15	—	1.9	—	
				I <sub>OH</sub> = -16 mA	3.0	2.4	2.8	—	2.4	—	
				I <sub>OH</sub> = -24 mA	3.0	2.3	2.68	—	2.3	—	
I <sub>OH</sub> = -32 mA	4.5	3.8	4.2	—	3.8	—					
Low-level output voltage	V <sub>OL</sub>	—	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 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 <sub>OL</sub> = 8 mA	2.3	—	0.1	0.3	—	0.3	
				I <sub>OL</sub> = 16 mA	3.0	—	0.15	0.4	—	0.4	
				I <sub>OL</sub> = 24 mA	3.0	—	0.22	0.55	—	0.55	
				I <sub>OL</sub> = 32 mA	4.5	—	0.22	0.55	—	0.55	
Input leakage current	I <sub>IN</sub>	—	V <sub>IN</sub> = 5.5 V or GND	0-5.5	—	—	±1	—	±10	μA	
Quiescent supply current	I <sub>CC</sub>	—	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5	—	—	2	—	20	μA	

## AC Characteristics (input: $t_r = t_f = 3 \text{ ns}$ )

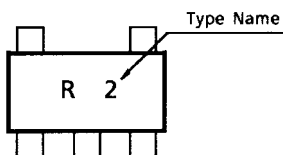
Characteristics	Symbol	Test Circuit	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit	
				VCC (V)	Min	Typ.	Max	Min		Max
Propagation delay time	t <sub>PLH</sub>	—	C <sub>L</sub> = 15 pF, R <sub>L</sub> = 1 MΩ	1.8	2.0	5.2	9.5	2.0	10.5	ns
				2.5 ± 0.2	0.8	3.4	7.0	0.8	7.5	
	3.3 ± 0.3			0.5	2.6	4.7	0.5	5.0		
	5.0 ± 0.5			0.5	2.2	4.1	0.5	4.4		
	t <sub>PHL</sub>		C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω	3.3 ± 0.3	1.5	3.3	5.2	1.5	5.5	
				5.0 ± 0.5	0.8	2.7	4.5	0.8	4.8	
Input capacitance	C <sub>IN</sub>	—	—	0-5.5	—	4	—	—	pF	
Power dissipation capacitance	C <sub>PD</sub>	—	(Note)	3.3	—	19	—	—	—	pF
				5.5	—	26	—	—	—	

Note: C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

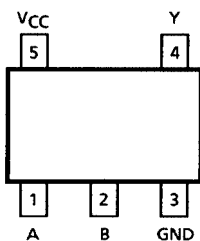
Average operating current can be obtained by the equation.

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

## Marking



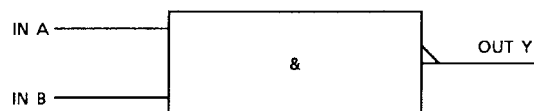
## Pin Assignment (top view)



## Truth Table

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

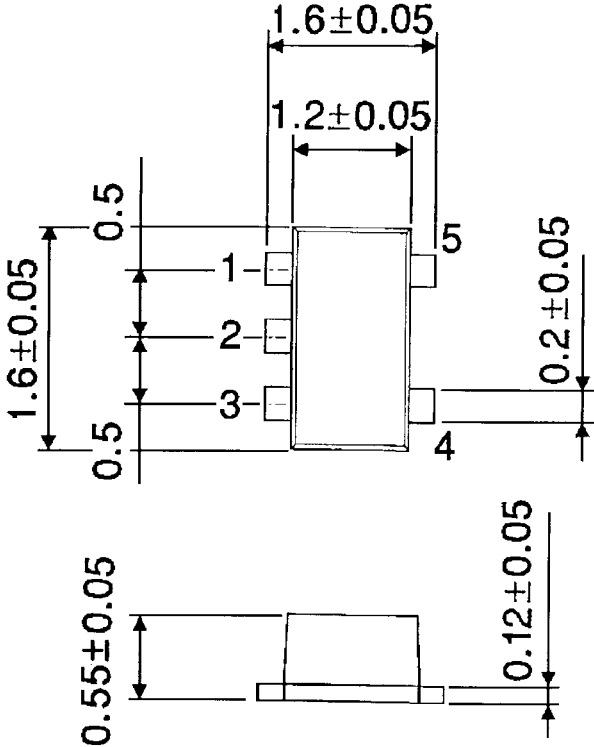
## Logic Diagram



**Package Dimensions**

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

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000707EBA

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