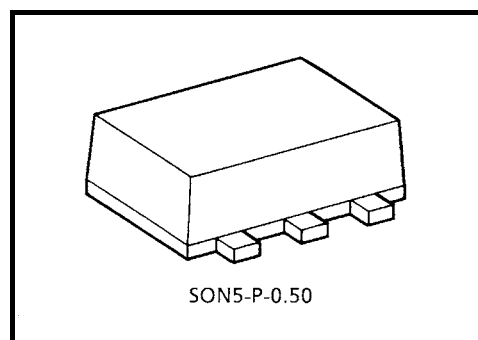


# TC7SH14FE

## SCHMITT INVERTER

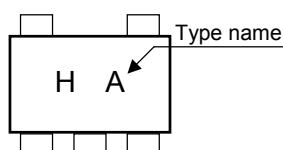
## Features

- Super high speed operation : tPD = 5.5 ns (typ.)  
@ VCC = 5 V
- Low power dissipation : ICC = 2 μA (Max.)  
@ Ta = 25°C
- 5.5V tolerant input.
- Wide operation voltage range : VCC (opr) = 2~5.5 V

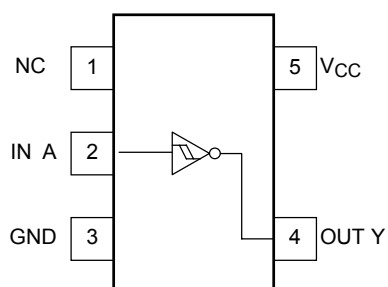


Weight: 0.003 g (typ.)

## Marking



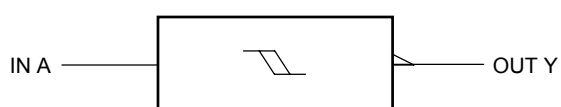
### Pin Assignment (top view)



### Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V <sub>CC</sub>	−0.5~7	V
DC input voltage	V <sub>IN</sub>	−0.5~7	V
DC output voltage	V <sub>OUT</sub>	−0.5~V <sub>CC</sub> + 0.5	V
Input diode current	I <sub>IK</sub>	−20	mA
Output diode current	I <sub>OK</sub>	±20	mA
DC output current	I <sub>OUT</sub>	±25	mA
DC V <sub>CC</sub> /ground current	I <sub>CC</sub>	±50	mA
Power dissipation	P <sub>D</sub>	150	mW
Storage temperature	T <sub>stg</sub>	−65~150	°C

## Logic Diagram



## Truth Table

A	Y
L	H
H	L

## 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 Condition		Ta = 25°C			Ta = -40~85°C		Unit
				$V_{CC}$ (V)	Min	Typ.	Max	Min	Max
Positive Threshold Voltage	$V_P$	—	—	3.0	—	—	2.20	—	2.20
				4.5	—	—	3.15	—	3.15
				5.5	—	—	3.85	—	3.85
Negative Threshold Voltage	$V_N$	—	—	3.0	0.90	—	—	0.90	—
				4.5	1.35	—	—	1.35	—
				5.5	1.65	—	—	1.65	—
Hysteresis Voltage	$V_H$	—	—	3.0	0.30	—	1.20	0.30	1.20
				4.5	0.40	—	1.40	0.40	1.40
				5.5	0.50	—	1.60	0.50	1.60
High-level output voltage	$V_{OH}$	$V_{IN} = V_{IL}$	$I_{OH} = -50 \mu\text{A}$	2.0	1.9	2.0	—	1.9	—
				3.0	2.9	3.0	—	2.9	—
				4.5	4.4	4.5	—	4.4	—
			$I_{OH} = -4 \text{ mA}$	3.0	2.58	—	—	2.48	—
			$I_{OH} = -8 \text{ mA}$	4.5	3.94	—	—	3.80	—
Low-level output voltage	$V_{OL}$	$V_{IN} = V_{IH}$	$I_{OL} = 50 \mu\text{A}$	2.0	—	0	0.1	—	0.1
				3.0	—	0	0.1	—	0.1
				4.5	—	0	0.1	—	0.1
			$I_{OL} = 4 \text{ mA}$	3.0	—	—	0.36	—	0.44
			$I_{OL} = 8 \text{ mA}$	4.5	—	—	0.36	—	0.44
Input leakage current	$I_{IN}$	$V_{IN} = 5.5 \text{ V or GND}$		0~5.5	—	—	$\pm 0.1$	—	$\pm 1.0$
Quiescent supply current	$I_{CC}$	$V_{IN} = V_{CC} \text{ or GND}$		5.5	—	—	2.0	—	20.0

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

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40~85°C		Unit
		V <sub>CC</sub> (V)	C <sub>L</sub> (pF)	Min	Typ.	Max	Min	Max	
Propagation delay time	t <sub>PLH</sub>	3.3 ± 0.3	15	—	8.3	12.8	1.0	15.0	ns
			50	—	10.8	16.3	1.0	18.5	
	t <sub>PHL</sub>	5.0 ± 0.5	15	—	5.5	8.6	1.0	10.0	
			50	—	7.0	10.6	1.0	12.0	
Input capacitance	C <sub>IN</sub>			—	4	10	—	10	pF
Power dissipation capacitance	C <sub>PD</sub>	(Note)		—	14	—	—	—	pF

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.

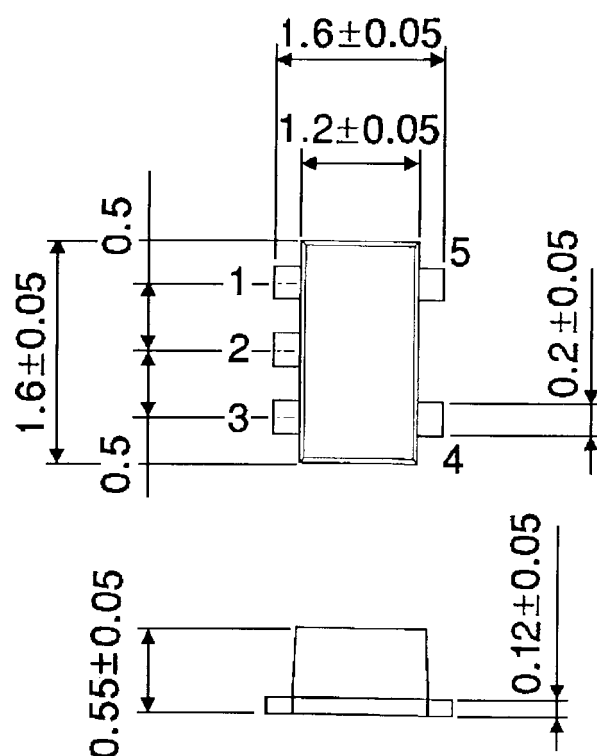
Average operating current can be obtained by the equation.

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

## Package Dimensions

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

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