

TC7WH34FC

Triple Non-Inverter

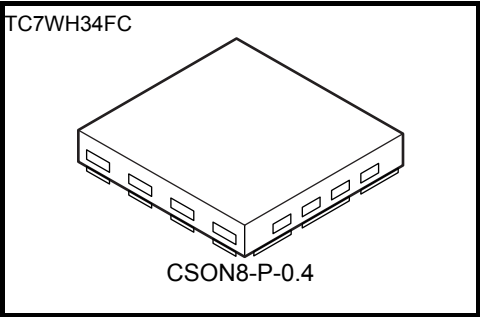
Features

- High-speed
  - Low power dissipation
  - High noise immunity
  - Operation voltage range
  - 5.5-V Tolerant inputs.
- : $t_{pd}$  = 3.8ns (Typ.) at  $V_{CC}$  = 5 V

: $I_{CC}$ =2 $\mu$ A(Max.) at  $T_a$ =25°C

: $V_{NIH}$ = $V_{NIL}$ =28% $V_{CC}$ (Min.)

: $V_{CC}$ (opr.)=2~5.5V



Weight: 0.002g (typ.)

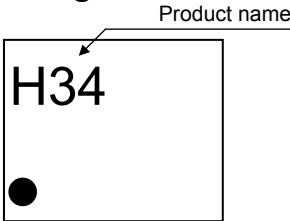
Absolute Maximum Ratings (  $T_a$  = 25°C )

Characteristics	Symbol	Ratingh	Unit
Power supply voltage	$V_{CC}$	-0.5~7.0	V
DC input voltage	$V_{IN}$	-0.5~7.0	V
DC output voltage	$V_{OUT}$	-0.5~ $V_{CC}$ + 0.5 (Note1)	V
Input diode current	$I_{IK}$	-20	mA
Output diode current	$I_{OK}$	$\pm$ 20 (Note2)	mA
DC output current	$I_{OUT}$	$\pm$ 25	mA
DC $V_{CC}$ /GND current	$I_{CC}$	$\pm$ 50	mA
Power dissipation	$P_D$	150 (Note3)	mW
Storage temperature	$T_{stg}$	-65~150	°C

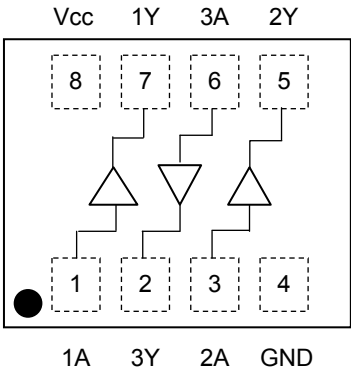
Note:    Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

- Note1 : High or Low State.  
 $I_{OUT}$  absolute maximum rating must be observed.
- Note2 :  $V_{OUT}$  < GND ,  $V_{OUT}$  >  $V_{CC}$
- Note3 : Mounted on an FR4 board.  
(25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 11.56 mm<sup>2</sup>)

Marking



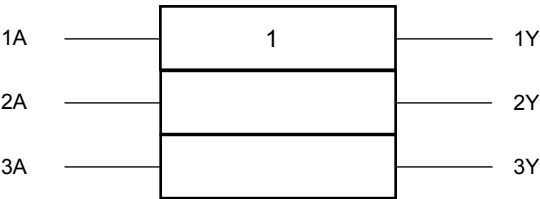
Pin Assignment (top view)



Truth Table

A	Y
L	L
H	H

IEC Logic Diagram



## Operating Ranges

Characteristics	Symbol	Rating	Unit
Power 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 ( $V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$ )	

## DC Electrical Characteristics

Characteristic	Symbol	Test condition		Ta = 25°C			Ta = -40~85°C		unit	
				V <sub>CC</sub> (V)	Min.	Typ.	Max.	Min.		Max.
High-level input voltage	V <sub>IH</sub>	—		2.0	1.5	—	—	1.5	—	V
				3.0~5.5	V <sub>CC</sub> × 0.7	—	—	V <sub>CC</sub> × 0.7	—	
Low-level input voltage	V <sub>IL</sub>	—		2.0	—	—	0.5	—	0.5	
				3.0~5.5	—	—	V <sub>CC</sub> × 0.3	—	V <sub>CC</sub> × 0.3	
High-level output voltage	V <sub>OH</sub>	V <sub>IN</sub> = V <sub>IH</sub>	I <sub>OH</sub> = -50 μA	2.0	1.9	2.0	—	1.9	—	V
				3.0	2.9	3.0	—	2.9	—	
				4.5	4.4	4.5	—	4.4	—	
			I <sub>OH</sub> = -4 mA	3.0	2.58	—	—	2.48	—	
				I <sub>OH</sub> = -8 mA	4.5	3.94	—	—	3.80	
Low-level output voltage	V <sub>OL</sub>	V <sub>IN</sub> = V <sub>IL</sub>	I <sub>OL</sub> = 50 μA	2.0	—	0.0	0.1	—	0.1	
				3.0	—	0.0	0.1	—	0.1	
				4.5	—	0.0	0.1	—	0.1	
			I <sub>OL</sub> = 4 mA	3.0	—	—	0.36	—	0.44	
				I <sub>OL</sub> = 8 mA	4.5	—	—	0.36	—	0.44
Input leakage current	I <sub>IN</sub>	V <sub>IN</sub> = 5.5 V or GND		0~5.5	—	—	±0.1	—	±1.0	μA
Quiescent supply current	I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND		5.5	—	—	2.0	—	20.0	μA

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

Characteristic	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> t <sub>pHL</sub>	3.3 ± 0.3	15	—	5.0	7.1	1.0	8.5	ns
			50	—	7.5	10.6	1.0	12.0	
		5.0 ± 0.5	15	—	3.8	5.5	1.0	6.5	
			50	—	5.3	7.5	1.0	8.5	
Input capacitance	C <sub>IN</sub>	—		—	4	10	—	10	pF
Power dissipation capacitance	C <sub>PD</sub>	(Note 4)		—	18	—	—	—	pF

Note 4 : C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

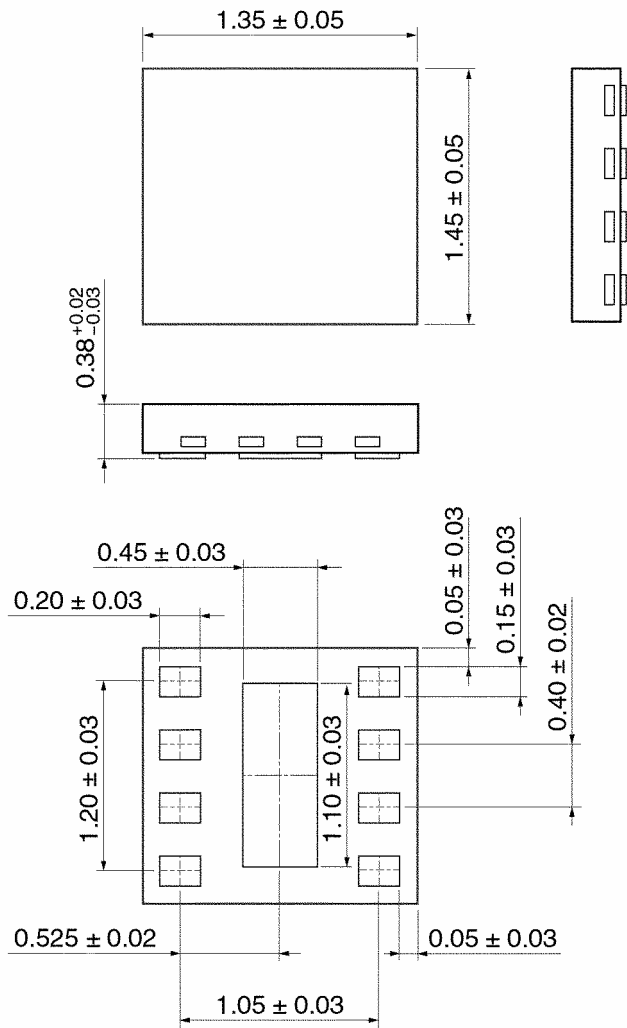
Average operating current can be obtained by the equation:

$$I_{CC \text{ (opr.)}} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/3$$

Package Dimensions

CSON8-P-0.4

Unit: mm



Weight : 0.002 g (Typ.)

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20070701-EN GENERAL

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