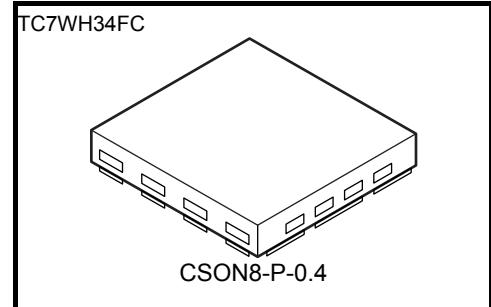


TC7WH34FC

Triple Non-Inverter

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.)
- Operation voltage range : $V_{CC}(\text{opr.}) = 2\text{~}5.5\text{V}$
- 5.5-V Tolerant inputs.



Weight: 0.002g (typ.)

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

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

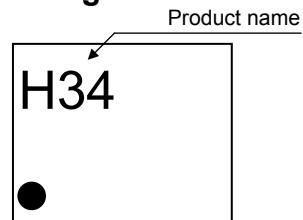
I_{OUT} absolute maximum rating must be observed.

Note2 : $V_{OUT} < GND$, $V_{OUT} > V_{CC}$

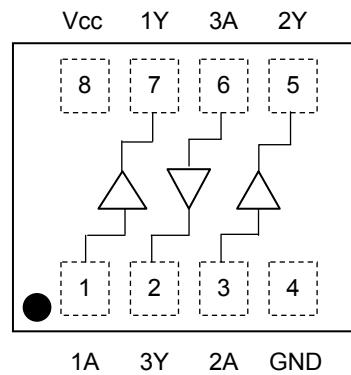
Note3 : Mounted on an FR4 board.

(25.4 mm \times 25.4 mm \times 1.6 t, Cu Pad: 11.56 mm²)

Marking



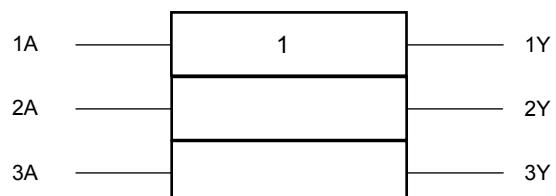
Pin Assignment (top view)



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

DC Electrical Characteristics

| Characteristic | Symbol | Test condition | Ta = 25°C | | | Ta = -40~85°C | | unit | | |
|---------------------------|----------|--------------------------------|-----------------------------------|---------------------|------|---------------------|---------------------|---------------------|---------------|---|
| | | | V_{CC} (V) | Min. | Typ. | Max. | Min. | | | |
| 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} | $V_{IN} = V_{IH}$ | $I_{OH} = -50\text{ }\mu\text{A}$ | 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 | — | |
| | | | $I_{OH} = -4\text{ mA}$ | 3.0 | 2.58 | — | — | 2.48 | — | |
| | | | $I_{OH} = -8\text{ mA}$ | 4.5 | 3.94 | — | — | 3.80 | — | |
| Low-level output voltage | V_{OL} | $V_{IN} = V_{IL}$ | $I_{OL} = 50\text{ }\mu\text{A}$ | 2.0 | — | 0.0 | 0.1 | — | 0.1 | V |
| | | | | 3.0 | — | 0.0 | 0.1 | — | 0.1 | |
| | | | | 4.5 | — | 0.0 | 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 | — | — | ± 0.1 | — | ± 1.0 | μA | |
| Quiescent supply current | I_{CC} | $V_{IN} = V_{CC}$ 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 _{CC} (V) | C _L (pF) | Min. | Typ. | Max. | Min. | Max. | |
| Propagation delay time | t _{pLH} | 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 _{IN} | — | | — | 4 | 10 | — | 10 | pF |
| Power dissipation capacitance | C _{PD} | (Note 4) | | | — | 18 | — | — | pF |

Note 4 : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

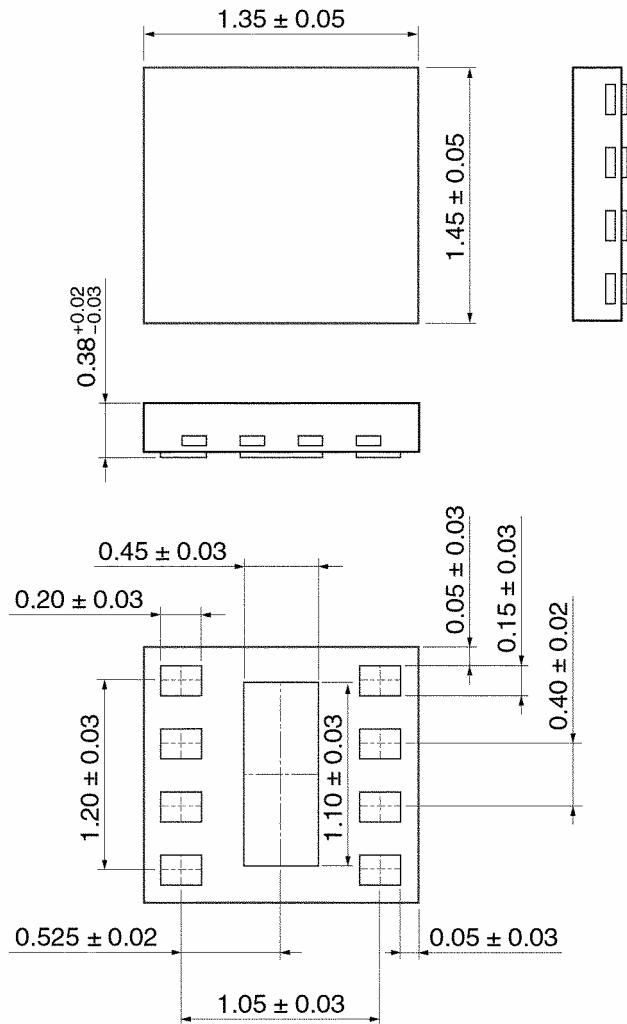
Average operating current can be obtained by the equation:

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

Package Dimensions

CSON8-P-0.4

Unit: mm



Weight : 0.002 g (Typ.)

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20070701-EN GENERAL

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