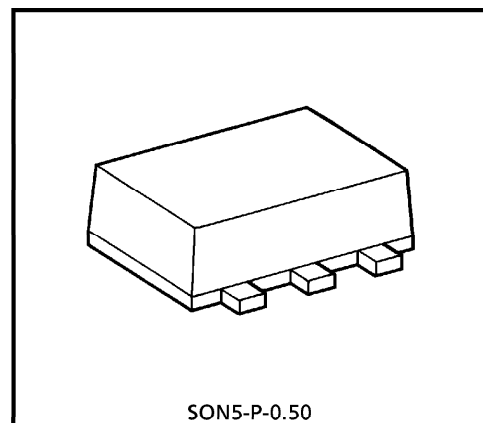


TC7SZU04AFE

INVERTER

FEATURES

- High Output Drive : $\pm 16 \text{ mA}$ (Typ.)
@ $V_{CC} = 4.5 \text{ V}$
- Low Quiescent Power : $I_{CC} < 2 \mu\text{A}$ (Max.)
@ $V_{CC} = 5.5 \text{ V}$, $T_a = 25^\circ\text{C}$
- Operation Voltage Range : $V_{CC}(\text{opr}) = 1.8 \sim 5.5 \text{ V}$
- Supply Voltage Data Retention : $V_{CC} = 1.5 \sim 5.5 \text{ V}$
- Latch-up Performance : $\pm 500 \text{ mA}$
- ESD Performance : Human Body Model $> \pm 2000 \text{ V}$
Machine Model $> \pm 200 \text{ V}$
- Power Down Protection is provided on all inputs.



SON5-P-0.50

Weight : 0.003 g (Typ.)

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|-----------------------------|-----------|--------------------------|------------------|
| Supply Voltage Range | V_{CC} | $-0.5 \sim 6$ | V |
| DC Input Voltage | V_{IN} | $-0.5 \sim 6$ | V |
| DC Output Voltage | V_{OUT} | $-0.5 \sim V_{CC} + 0.5$ | V |
| Input Diode Current | I_{IK} | ± 20 | mA |
| Output Diode Current | I_{OK} | ± 20 | mA |
| DC Output Current | I_{OUT} | ± 50 | mA |
| DC V_{CC} /Ground Current | I_{CC} | ± 50 | mA |
| Power Dissipation | P_D | 150 | mW |
| Storage Temperature | T_{stg} | $-65 \sim 150$ | $^\circ\text{C}$ |
| Lead Temperature (10 s) | T_L | 260 | $^\circ\text{C}$ |

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DC ELECTRICAL CHARACTERISTICS

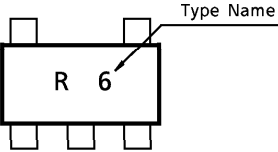
| CHARACTERISTIC | SYMBOL | TEST CONDITION | | V _{CC} (V) | Ta = 25°C | | | Ta = -40~85°C | | UNIT |
|---------------------------|-----------------|---|---------------------------|------------------------|---------------------------|------|---------------------------|---------------------------|---------------------------|------|
| | | | | | MIN. | TYP. | MAX. | MIN. | MAX. | |
| High-Level Input Voltage | V _{IH} | | | 1.8 | 0.85 × V _{CC} | — | — | 0.85 × V _{CC} | — | V |
| | | | | 2.3 – 5.5 | 0.8 × V _{CC} | — | — | 0.8 × V _{CC} | — | |
| Low-Level Input Voltage | V _{IL} | V _{IN} = V _{IH} or V _{IL} | | 1.8 | — | — | 0.15 × V _{CC} | — | 0.15 × V _{CC} | V |
| | | | | 2.3 – 5.5 | — | — | 0.2 × V _{CC} | — | 0.2 × V _{CC} | |
| High-Level Output Voltage | V _{OH} | V _{IN} = V _{IL} | I _{OH} = -100 μA | 1.8 | 1.6 | 1.8 | — | 1.6 | — | V |
| | | | | 2.3 | 2.1 | 2.3 | — | 2.1 | — | |
| | | | | 3.0 | 2.7 | 3.0 | — | 2.7 | — | |
| | | | | 4.5 | 4.0 | 4.4 | — | 4.0 | — | |
| | | V _{IN} = GND | I _{OH} = -4 mA | 2.3 | 1.9 | 2.14 | — | 1.9 | — | |
| | | | I _{OH} = -8 mA | 3.0 | 2.4 | 2.75 | — | 2.4 | — | |
| | | | I _{OH} = -12 mA | 3.0 | 2.3 | 2.61 | — | 2.3 | — | |
| | | | I _{OH} = -16 mA | 4.5 | 3.8 | 4.13 | — | 3.8 | — | |
| Low-Level Output Voltage | V _{OL} | V _{IN} = V _{IH} | I _{OL} = 100 μA | 1.8 | — | 0 | 0.2 | — | 0.2 | V |
| | | | | 2.3 | — | 0 | 0.2 | — | 0.2 | |
| | | | | 3.0 | — | 0 | 0.3 | — | 0.3 | |
| | | | | 4.5 | — | 0 | 0.5 | — | 0.5 | |
| | | V _{IN} = V _{CC} | I _{OL} = 4 mA | 2.3 | — | 0.1 | 0.3 | — | 0.3 | |
| | | | I _{OL} = 8 mA | 3.0 | — | 0.17 | 0.4 | — | 0.4 | |
| | | | I _{OL} = 12 mA | 3.0 | — | 0.25 | 0.55 | — | 0.55 | |
| | | | I _{OL} = 16 mA | 4.5 | — | 0.26 | 0.55 | — | 0.55 | |
| Input Leakage Current | I _{IN} | V _{IN} = 5.5 V or GND | | 0 – 5.5 | — | — | ± 1 | — | ± 10 | μA |
| Quiescent Supply Current | I _{CC} | V _{IN} = V _{CC} or GND | | 5.5 | — | — | 2 | — | 20 | μA |

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3\text{ ns}$)

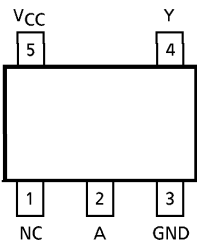
| CHARACTERISTIC | SYMBOL | TEST CONDITION | V_{CC} (V) | $T_a = 25^{\circ}\text{C}$ | | | $T_a = -40\sim 85^{\circ}\text{C}$ | | UNIT |
|-------------------------------|------------------------|---|---------------|----------------------------|------|------|------------------------------------|------|------|
| | | | | MIN. | TYP. | MAX. | MIN. | MAX. | |
| Propagation Delay Time | t_{PLH} t_{PHL} | $C_L = 15\text{ pF}$, $R_L = 1\text{ M}\Omega$ | 1.8 | 1.0 | — | 8.5 | 1.0 | 9.0 | ns |
| | | | 2.5 ± 0.2 | 0.8 | — | 6.2 | 0.8 | 6.5 | |
| | | | 3.3 ± 0.3 | 0.5 | — | 4.5 | 0.5 | 4.8 | |
| | | | 5.0 ± 0.5 | 0.5 | — | 3.9 | 0.5 | 4.1 | |
| | | $C_L = 50\text{ pF}$, $R_L = 500\text{ }\Omega$ | 3.3 ± 0.3 | 1.0 | — | 6.0 | 1.0 | 6.5 | |
| | | | 5.0 ± 0.5 | 0.8 | — | 5.0 | 0.8 | 5.5 | |
| Input Capacitance | C_{IN} | | 0 – 5.5 | — | 5 | — | — | — | pF |
| Power Dissipation Capacitance | C_{PD} | (Note 1) | 3.3 | — | 9 | — | — | — | pF |
| | | | 5.5 | — | 25 | — | — | — | |

(Note 1) : 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



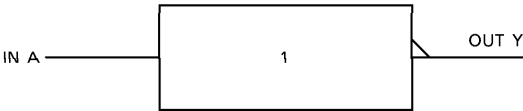
PIN ASSIGNMENT (TOP VIEW)



TRUTH TABLE

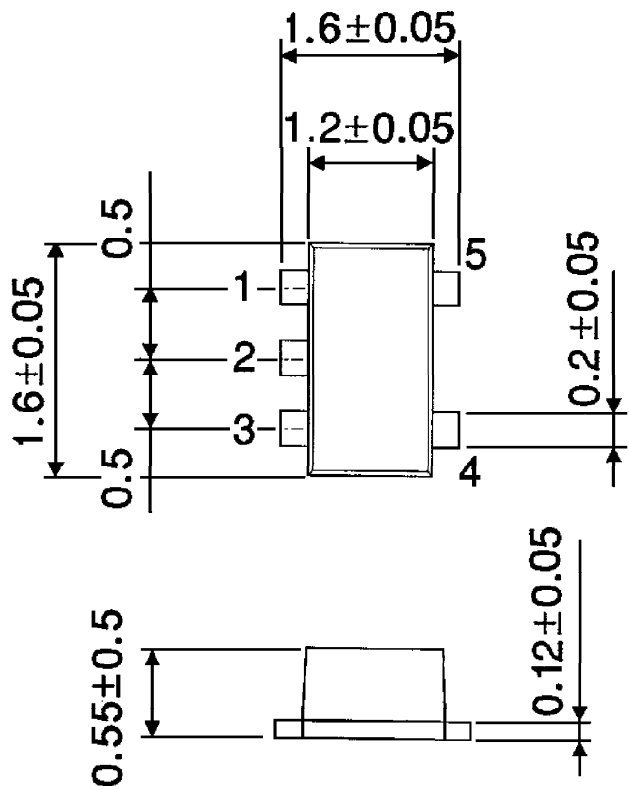
| A | Y |
|---|---|
| L | H |
| H | L |

LOGIC DIAGRAM



PACKAGE DIMENSIONS
SON5-P-0.50

Unit : mm



Weight : 0.003 g (Typ.)