TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HC4075AP, TC74HC4075AF

TRIPLE 3-INPUT OR GATE

The TC74HC4075A is a high speed CMOS 3-INPUT OR GATE fabricated with silicon gate C^2MOS technology.

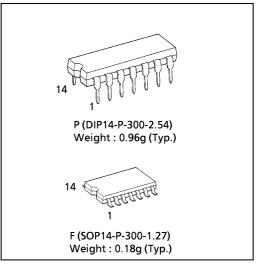
It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

The internal circuit is composed of 4 stages including a buffered outputs, which provide high noise immunity and stable output.

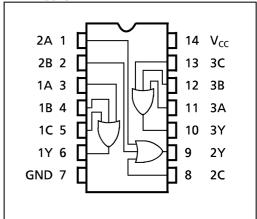
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES:

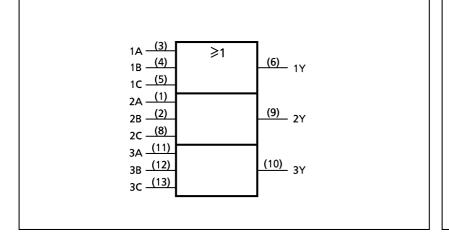
- High Speed-----t_{pd} = 8ns(typ.) at V_{CC} = 5V
- Low Power Dissipation ············ $I_{CC} = 2\mu A(Max.)$ at $Ta = 25^{\circ}C$
- High Noise Immunity $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (Min.)
- Output Drive Capability 10 LSTTL Loads
- Symmetrical Output Impedance··· $|I_{OH}| = I_{OL} = 4mA(Min.)$
- Balanced Propagation Delays $\cdots t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range ···· V_{CC} (opr.) = 2V~6V
- Pin and Function Compatible with 4075B



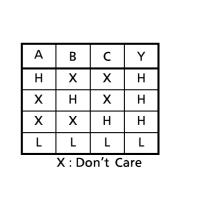
PIN ASSIGNMENT



IEC LOGIC SYMBOL



TRUTH TABLE



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TOSHIBA

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | VALUE | UNIT |
|-------------------------------------|------------------|--------------------------|------|
| Supply Voltage Range | V _{cc} | − 0.5~7 | ٧ |
| DC Input Voltage | V _{IN} | $-0.5 \sim V_{CC} + 0.5$ | V |
| DC Output Voltage | V _{OUT} | $-0.5 \sim V_{CC} + 0.5$ | ٧ |
| Input Diode Current | l _{i K} | ± 20 | mA |
| Output Diode Current | I _{OK} | ± 20 | mA |
| DC Output Current | I _{OUT} | ± 25 | mA |
| DC V _{CC} / Ground Current | I _{cc} | ± 50 | mA |
| Power Dissipation | P _D | 500 (DIP)* / 180 (SOP) | mW |
| Storage Temperature | T _{stg} | −65~150 | °C |

^{*500}mW in the range of Ta= $-40^{\circ}\text{C}\sim65^{\circ}\text{C}$. From Ta=65°C to 85°C a derating factor of $-10\text{mW}/^{\circ}\text{C}$ shall be applied until 300mW.

RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | VALUE | UNIT |
|--------------------------|---------------------------------|---|------|
| Supply Voltage | V _{cc} | 2~6 | V |
| Input Voltage | V _{IN} | 0~V _{cc} | V |
| Output Voltage | V _{OUT} | 0~V _{CC} | V |
| Operating Temperature | T _{opr} | −40~85 | °C |
| Input Rise and Fall Time | t _r , t _f | $0 \sim 1000 (V_{CC} = 2.0V)$ $0 \sim 500 (V_{CC} = 4.5V)$ $0 \sim 400 (V_{CC} = 6.0V)$ | ns |

DC ELECTRICAL CHARACTERISTICS

| PARAMETER | CVMPOL | TEST CO | MOITION | V _{cc} | Ta = 25°C | | Ta = −40~85°C | | UNIT | |
|--------------------------------|--------------------|--|--|-------------------|----------------------|-------------------|----------------------|----------------------|----------------------|------|
| PARAMETER SYMBOI | | TEST CONDITION | | (V) | MIN. | TYP. | MAX. | MIN. | MAX. | UNIT |
| High - Level Input Voltage | V _{IH} | | | 2.0 4.5 6.0 | 1.50 3.15 4.20 | - - | _ _ _ | 1.50 3.15 4.20 | _ _ _ | v |
| Low - Level Input Voltage | VIL | | | 2.0 4.5 6.0 | | _ _ _ | 0.50 1.35 1.80 | | 0.50 1.35 1.80 | v |
| High - Level Output Voltage | V _{OH} | V _{IN} = | $I_{OH} = -20\mu A$ | 2.0 4.5 6.0 | 1.9 4.4 5.9 | 2.0 4.5 6.0 | _ _ _ | 1.9 4.4 5.9 | _ _ _ | V |
| | | V _{IH} or V _{IL} | $I_{OH} = -4 \text{ mA}$ $I_{OH} = -5.2 \text{ mA}$ | 4.5 6.0 | 4.18 5.68 | 4.31 5.80 | _ | 4.13 5.63 | _ | |
| Low - Level Output Voltage | V _{1 N} = | I _{OL} = 20μΑ | 2.0 4.5 6.0 | _ _ _ | 0.0 0.0 0.0 | 0.1 0.1 0.1 | _ _ _ | 0.1 0.1 0.1 | v | |
| | | Vol V _{IH} or V _{IL} | $I_{OL} = 4 mA$ $I_{OL} = 5.2 mA$ | 4.5 6.0 | _ | 0.17 0.18 | 0.26 0.26 | _ | 0.33 0.33 | |
| Input Leakage Current | I _{I N} | $V_{IN} = V_{CC}$ or GND | | 6.0 | _ | _ | ± 0.1 | _ | ± 1.0 | |
| Quiescent Supply Current | I _{cc} | $V_{IN} = V_{CC}$ or GND | | 6.0 | _ | _ | 1.0 | _ | 10.0 | μΑ |

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AC ELECTRICAL CHARACTERISTICS ($C_L = 15pF$, $V_{CC} = 5V$, $Ta = 25^{\circ}C$, Input $t_r = t_f = 6ns$)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|------------------------|--------------------------------------|----------------|------|------|------|------|
| Output Transition Time | t _{TLH} t _{THL} | | _ | 4 | 8 | |
| Propagation Delay Time | t _{pLH} t _{pHL} | | _ | 8 | 15 | ns |

AC ELECTRICAL CHARACTERISTICS ($C_L = 50 pF$, Input $t_r = t_f = 6 ns$)

| PARAMETER | SYMBOL | TEST CONDITION | | Ta = 25°C | | - | Ta = −40~85°C | | UNIT |
|-------------------------------|---------------------|----------------|-------------|-----------|------|------|---------------|------|------|
| | | | $V_{CC}(V)$ | MIN. | TYP. | MAX. | MIN. | MAX. | OWIT |
| | t _{TLH} | | 2.0 | _ | 30 | 75 | _ | 95 | |
| Output Transition Time | | | 4.5 | _ | 8 | 15 | - | 19 | |
| • | t _{THL} | | 6.0 | I | 7 | 13 | _ | 16 | |
| Propagation Delay Time | + | | 2.0 | _ | 35 | 90 | _ | 115 | ns |
| | t _{pLH} | | 4.5 | _ | 11 | 18 | - | 23 | |
| | t_{pHL} | | 6.0 | | 9 | 15 | _ | 20 | |
| Input Capacitance | C _{IN} | | | _ | 5 | 10 | _ | 10 | ne l |
| Power Dissipation Capacitance | C _{PD} (1) | | | | 27 | _ | _ | _ | pF |

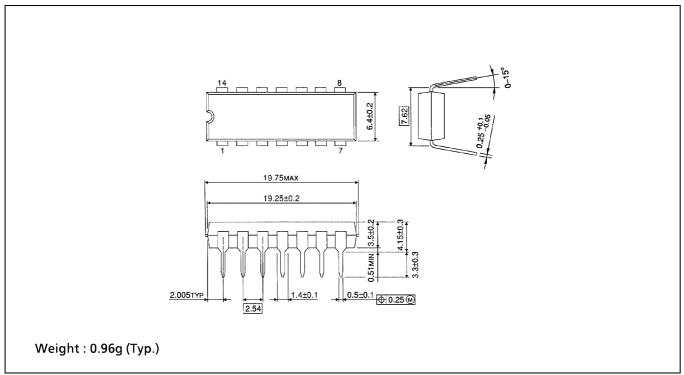
Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation:

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

DIP 14PIN OUTLINE DRAWING (DIP14-P-300-2.54)

Unit in mm



SOP 14PIN (200mil BODY) OUTLINE DRAWING (SOP14-P-300-1.27)

Unit in mm

