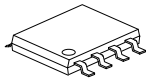
# U74AUP1G74

**CMOS IC**

## LOW-POWER SINGLE POSITIVE EDGE TRIGGERED D-TYPE FLIP-FLOP WITH CLEAR AND PRESET



TSSOP-8

DFN2030-8

CDFN2030-8

## ■ DESCRIPTION

This **U74AUP1G74** ensures a very low static- and dynamic-power consumption across the entire $V_{CC}$ range of 0.8 V to 3.6 V.

This device is fully specified for partial power-down using Ioff. The Ioff circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

## ■ FEATURES

* Wide supply voltage range from 0.8V to 3.6V
* Inputs accept voltages up to 3.6V
* $I_{OFF}$ supports partial-power-down mode
* Low static power consumption; $I_{CC}$=0.5μA (Max.)
* Optimized for 3.3V Operation

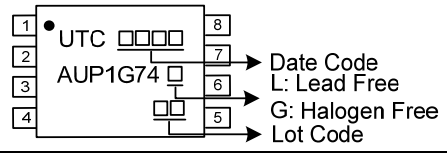
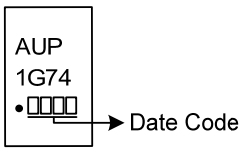
## ■ ORDERING INFORMATION

| Ordering Number | | Package | Packing |
|---|---|---|---|
| Lead Free | Halogen Free | | |
| U74AUP1G74L-P08-R | U74AUP1G74G-P08-R | TSSOP-8 | Tape Reel |
| U74AUP1G74L-K08-2030-R | U74AUP1G74G-K08-2030-R | DFN2030-8 | Tape Reel |
| U74AUP1G74L-CK08-2030-R | U74AUP1G74G-CK08-2030-R | CDFN2030-8 | Tape Reel |

U74AUP1G74G-P08-R
(1) Packing Type
(2) Package Type
(3) Green Package

(1) R: Tape Reel
(2) P08: TSSOP-8, K08-2030: DFN2030-8
CK08-2030: CDFN2030-8
(3) G: Halogen Free and Lead Free, L: Lead Free

## ■ MARKING

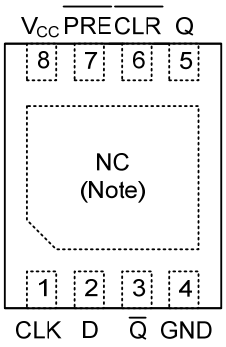
| TSSOP-8 | DFN2030-8 / CDFN2030-8 |
|---|---|
|  |  |



## ■ PIN CONFIGURATION

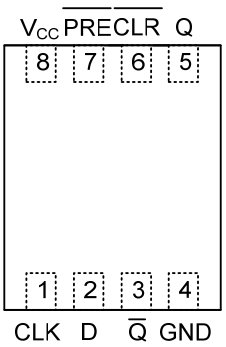


TSSOP-8





DFN2030-8
(Top View)





CDFN2030-8
(Top View)

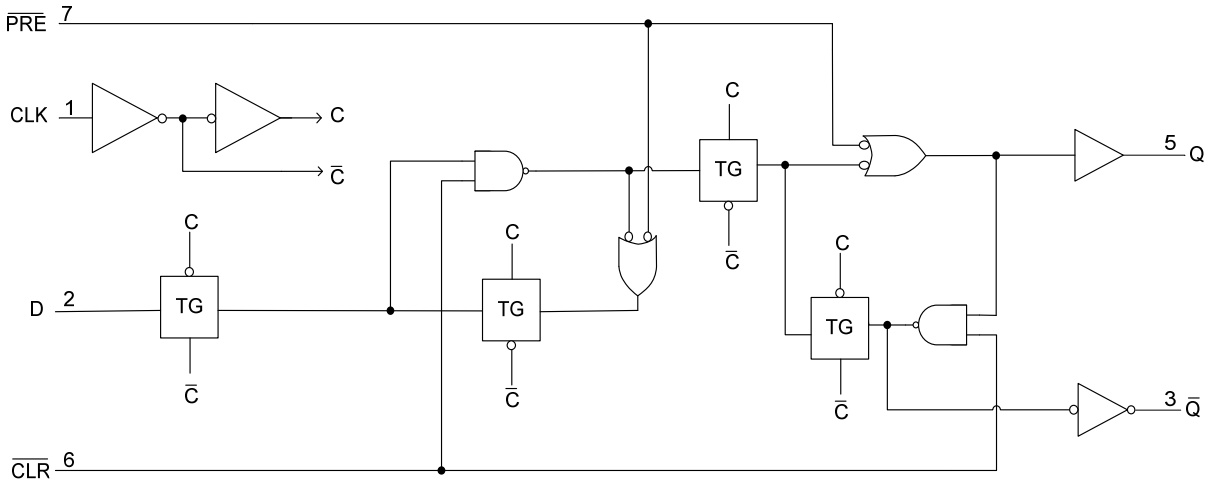
Note: No connect.

## ■ FUNCTION TABLE

| INPUTS | | | | OUTPUTS | |
|---|---|---|---|---|---|
| $\overline{PRE}$ | $\overline{CLR}$ | CLK | D | Q | $\overline{Q}$ |
| L | H | X | X | H | L |
| H | L | X | X | L | H |
| L | L | X | X | H | H |
| H | H | ↑ | H | H | L |
| H | H | ↑ | L | L | H |
| H | H | L | X | $Q_0$ | $\overline{Q}_0$ |

Note: H: HIGH voltage level; L: LOW voltage level; X: don't care; Z: high impedance state

■ LOGIC DIAGRAM (positive logic)



## ■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | CONDITIONS | RATINGS | UNIT |
|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | | -0.5 ~ +4.6 | V |
| Input Voltage | $V_{IN}$ | | -0.5 ~ +4.6 | V |
| Output Voltage | $V_{OUT}$ | Output in the high or low state | -0.5 ~ $V_{CC}$ +0.5 | V |
| | | Output in the power-off state | -0.5 ~ +4.6 | V |
| Continuous Output Current | $I_{OUT}$ | $V_{OUT}$=0 ~ $V_{CC}$ | ±20 | mA |
| Continuous current through | | $V_{CC}$ or GND | ±50 | mA |
| Input Clamp Current | $I_{IK}$ | $V_{IN}$<0 | -50 | mA |
| Output Clamp Current | $I_{OK}$ | $V_{IN}$<0 | -50 | mA |
| Storage Temperature Range | $T_{STG}$ | | -65 ~ +150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | Operating | 0.8 | | 3.6 | V |
| Input Voltage | $V_{IN}$ | | 0 | | 3.6 | V |
| Output Voltage | $V_{OUT}$ | High or low state | 0 | | $V_{CC}$ | V |
| Input Transition Rise or Fall Rate | Δt/Δv | $V_{CC}$=0.8V ~ 3.6V | | | 200 | ns/V |
| Operating Temperature | $T_A$ | | -40 | | +125 | °C |

## ■ ELECTRICAL CHARACTERISTICS ($T_A$=25°C , unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| High-level Input Voltage | $V_{IH}$ | $V_{CC}$=0.8V | | $V_{CC}$ | | | V |
| | | $V_{CC}$=1.1V ~ 1.95V | | 0.7×$V_{CC}$ | | | V |
| | | $V_{CC}$=2.3V ~2.7V | | 1.6 | | | V |
| | | $V_{CC}$=3V ~3.6V | | 2 | | | |
| Low-level Input Voltage | $V_{IL}$ | $V_{CC}$=0.8V | | | | 0 | V |
| | | $V_{CC}$=1.1V ~ 1.95V | | | | 0.3×$V_{CC}$ | V |
| | | $V_{CC}$=2.3V ~2.7V | | | | 0.7 | V |
| | | $V_{CC}$=3V ~3.6V | | | | 0.9 | |
| High-Level Output Voltage | $V_{OH}$ | $V_{CC}$=0.8 ~ 3.6V, $I_{OH}$=-20μA | | $V_{CC}$-0.1 | | | V |
| | | $V_{CC}$=1.1V, $I_{OH}$=-1.1mA | | 0.7×$V_{CC}$ | | | V |
| | | $V_{CC}$=1.4V, $I_{OH}$=-1.7mA | | 1.11 | | | V |
| | | $V_{CC}$=1.65V, $I_{OH}$=-1.9mA | | 1.32 | | | V |
| | | $V_{CC}$=2.3V | $I_{OH}$=-2.3mA | 2.05 | | | V |
| | | | $I_{OH}$=-3.1mA | 1.9 | | | V |
| | | $V_{CC}$=3V | $I_{OH}$=-2.7mA | 2.72 | | | V |
| | | | $I_{OH}$=-4mA | 2.6 | | | V |
| Low-Level Output Voltage | $V_{OL}$ | $V_{CC}$=0.8 ~ 3.6V, $I_{OL}$=20μA | | | | 0.1 | V |
| | | $V_{CC}$=1.1V, $I_{OL}$=1.1mA | | | | 0.3×$V_{CC}$ | V |
| | | $V_{CC}$=1.4V, $I_{OL}$=1.7mA | | | | 0.31 | V |
| | | $V_{CC}$=1.65V, $I_{OL}$=1.9mA | | | | 0.31 | V |
| | | $V_{CC}$=2.3V | $I_{OL}$=2.3mA | | | 0.31 | V |
| | | | $I_{OL}$=3.1mA | | | 0.44 | V |
| | | $V_{CC}$=3V | $I_{OL}$=2.7mA | | | 0.31 | V |
| | | | $I_{OL}$=4mA | | | 0.44 | V |

## ■ ELECTRICAL CHARACTERISTICS (Cont.)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Input Leakage Current (A or B Input) | $I_{I(LEAK)}$ | $V_{CC}$=0 ~ 3.6V, $V_{IN}$=GND ~ 3.6V | | | ±0.1 | μA |
| Power OFF Leakage Current | $I_{off}$ | $V_{CC}$=0 V, $V_{IN}$ or $V_{OUT}$=0 ~ 3.6V | | | ±0.2 | μA |
| Additional Power OFF Leakage Current | $\Delta I_{off}$ | $V_{CC}$=0 V~0.2V, $V_{IN}$ or $V_{OUT}$=0 ~ 3.6V | | | ±0.2 | μA |
| Quiescent Supply Current | $I_{CC}$ | $V_{CC}$=0.8 ~3.6V, $V_{IN}$=GND or ($V_{CC}$ or 3.6V), $I_{OUT}$=0 | | | 0.5 | μA |
| Additional Quiescent Supply Current Per Input Pin | $\Delta I_{CC}$ | $V_{CC}$=3.3 V, $V_{IN}$ =$V_{CC}$-0.6V(Note), $I_{OUT}$=0 | | | 40 | μA |
| Input Capacitance | $C_I$ | $V_{CC}$=0V, $V_{IN}$=$V_{CC}$ or GND | | 1.5 | | pF |
| | | $V_{CC}$=3.6V, $V_{IN}$=$V_{CC}$ or GND | | 1.5 | | pF |
| Output Capacitance | $C_{OUT}$ | $V_{CC}$ =0V, $V_{OUT}$=GND | | 3 | | pF |

Note: One input at $V_{CC}$ – 0.6 V, other input at $V_{CC}$ or GND.

## ■ TIMING REQUIREMENTS

| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Clock frequency | $f_{clock}$ | $V_{CC}$=0.8V | | | 21 | | MHz |
| | | $V_{CC}$=1.2V±0.1V | | | | 40 | MHz |
| | | $V_{CC}$=1.5V±0.1V | | | | 50 | MHz |
| | | $V_{CC}$=1.8V±0.15V | | | | 60 | MHz |
| | | $V_{CC}$=2.5V±0.2V | | | | 90 | MHz |
| | | $V_{CC}$=3.3V±0.3V | | | | 90 | MHz |
| Pulse duration | tw | $V_{CC}$=0.8V | CLK High or Low | | 3.5 | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Low | | 4.5 | | ns |
| | | $V_{CC}$=1.2V±0.1V | CLK High or Low | 2 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Low | 2 | | | ns |
| | | $V_{CC}$=1.5V±0.1V | CLK High or Low | 2 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Low | 2 | | | ns |
| | | $V_{CC}$=1.8V±0.15V | CLK High or Low | 2 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Low | 2 | | | ns |
| | | $V_{CC}$=2.5V±0.2V | CLK High or Low | 2 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Low | 2 | | | ns |
| | | $V_{CC}$=3.3V±0.3V | CLK High or Low | 2 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Low | 2 | | | ns |

■ TIMING REQUIREMENTS (Cont.)

| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Setup time before CLK↑ from Data to $\overline{PRE}$ or $\overline{CLR}$ inactive | tsu | $V_{CC}$=0.8V | Data High | | 3 | | ns |
| | | | Data Low | | 1 | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Inactive | | 1 | | ns |
| | | $V_{CC}$=1.2V±0.1V | Data High | 1.3 | | | ns |
| | | | Data Low | 1.2 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Inactive | 0.5 | | | ns |
| | | $V_{CC}$=1.5V±0.1V | Data High | 1 | | | ns |
| | | | Data Low | 1 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Inactive | 0.5 | | | ns |
| | | $V_{CC}$=1.8V±0.15V | Data High | 1 | | | ns |
| | | | Data Low | 1 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Inactive | 0.5 | | | ns |
| | | $V_{CC}$=2.5V±0.2V | Data High | 0.5 | | | ns |
| | | | Data Low | 1 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Inactive | 0.5 | | | ns |
| | | $V_{CC}$=3.3V±0.3V | Data High | 0.5 | | | ns |
| | | | Data Low | 1 | | | ns |
| | | | $\overline{PRE}$ or $\overline{CLR}$ Inactive | 0.5 | | | ns |
| Hold time, data after CLK↑ | $t_h$ | $V_{CC}$=0.8V | | | 0 | | ns |
| | | $V_{CC}$=1.2V±0.1V | | 0 | | | ns |
| | | $V_{CC}$=1.5V±0.1V | | 0 | | | ns |
| | | $V_{CC}$=1.8V±0.15V | | 0 | | | ns |
| | | $V_{CC}$=2.5V±0.2V | | 0 | | | ns |
| | | $V_{CC}$=3.3V±0.3V | | 0 | | | ns |

■ SWITCHING CHARACTERISTICS ($T_A$ =25°C , unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Maximum Frequency Response | $f_{Max}$ | $C_L$=5pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 60 | | MHz |
| | | | $V_{CC}$=1.2V±0.1V | | 80 | | MHz |
| | | | $V_{CC}$=1.5V±0.1V | | 125 | | MHz |
| | | | $V_{CC}$=1.8V±0.15V | | 150 | | MHz |
| | | | $V_{CC}$=2.5V±0.2V | | 180 | | MHz |
| | | | $V_{CC}$=3.3V±0.3V | | 190 | | MHz |
| | | $C_L$=10pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 46 | | MHz |
| | | | $V_{CC}$=1.2V±0.1V | | 65 | | MHz |
| | | | $V_{CC}$=1.5V±0.1V | | 95 | | MHz |
| | | | $V_{CC}$=1.8V±0.15V | | 110 | | MHz |
| | | | $V_{CC}$=2.5V±0.2V | | 170 | | MHz |
| | | | $V_{CC}$=3.3V±0.3V | | 180 | | MHz |
| | | $C_L$=15pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 41 | | MHz |
| | | | $V_{CC}$=1.2V±0.1V | | 75 | | MHz |
| | | | $V_{CC}$=1.5V±0.1V | | 95 | | MHz |
| | | | $V_{CC}$=1.8V±0.15V | | 100 | | MHz |
| | | | $V_{CC}$=2.5V±0.2V | | 150 | | MHz |
| | | | $V_{CC}$=3.3V±0.3V | | 200 | | MHz |
| | | $C_L$=30pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 21 | | MHz |
| | | | $V_{CC}$=1.2V±0.1V | | 50 | | MHz |
| | | | $V_{CC}$=1.5V±0.1V | | 60 | | MHz |
| | | | $V_{CC}$=1.8V±0.15V | | 75 | | MHz |
| | | | $V_{CC}$=2.5V±0.2V | | 100 | | MHz |
| | | | $V_{CC}$=3.3V±0.3V | | 100 | | MHz |
| Propagation delay from input(CLK) to output(Q) | $t_{PD}$ | $C_L$=5pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 31 | | MHz |
| | | | $V_{CC}$=1.2±0.1V | 2 | 10 | 20 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 6 | 12 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 5 | 9 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 3 | 6 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 3 | 4 | ns |
| | | $C_L$=10pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 33 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 2 | 10 | 22 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 7 | 13 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 6 | 10 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 4 | 6 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 3 | 5 | ns |
| | | $C_L$=15pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 35 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 2 | 12 | 23.1 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 8 | 14.1 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 6 | 10.7 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 4 | 7 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 4 | 5.4 | ns |
| | | $C_L$=30pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 32 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 3 | 14 | 27 | ns |
| | | | $V_{CC}$=1.5±0.1V | 3 | 10 | 17 | ns |
| | | | $V_{CC}$=1.8±0.15V | 3 | 8 | 13 | ns |
| | | | $V_{CC}$=2.5±0.2V | 3 | 6 | 9 | ns |
| | | | $V_{CC}$=3.3±0.3V | 3 | 5 | 7 | ns |

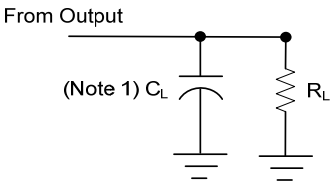
## ■ SWITCHING CHARACTERISTICS (Cont.)

| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Propagation delay from input(CLK) to output( $\overline{Q}$ ) | $t_{PD}$ | $C_L$=5pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 28 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 2 | 9 | 19 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 6 | 11 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 5 | 9 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 3 | 6 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 3 | 4 | ns |
| | | $C_L$=10pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 30 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 2 | 10 | 20 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 7 | 12 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 5 | 9 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 4 | 6 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 3 | 5 | ns |
| | | $C_L$=15pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 32 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 2 | 11 | 21.8 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 7 | 13.5 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 6 | 10.4 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 4 | 7.1 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 3 | 5.4 | ns |
| | | $C_L$=30pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 40 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 3 | 13 | 26 | ns |
| | | | $V_{CC}$=1.5±0.1V | 3 | 9 | 16 | ns |
| | | | $V_{CC}$=1.8±0.15V | 3 | 7 | 13 | ns |
| | | | $V_{CC}$=2.5±0.2V | 3 | 5 | 9 | ns |
| | | | $V_{CC}$=3.3±0.3V | 3 | 5 | 7 | ns |
| Propagation delay from input( $\overline{PRE}$ or $\overline{CLR}$ ) to output(Q or $\overline{Q}$ ) | $t_{PD}$ | $C_L$=5pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 26 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 2 | 9 | 20 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 6 | 12 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 5 | 9 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 3 | 6 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 3 | 5 | ns |
| | | $C_L$=10pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 29 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 2 | 10 | 21 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 7 | 13 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 5 | 10 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 4 | 7 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 3 | 5 | ns |
| | | $C_L$=15pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 31 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 2 | 11 | 23 | ns |
| | | | $V_{CC}$=1.5±0.1V | 2 | 7 | 14 | ns |
| | | | $V_{CC}$=1.8±0.15V | 2 | 6 | 11 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | 4 | 7 | ns |
| | | | $V_{CC}$=3.3±0.3V | 2 | 4 | 6 | ns |
| | | $C_L$=30pF, $R_L$=5KΩ | $V_{CC}$=0.8V | | 38 | | ns |
| | | | $V_{CC}$=1.2±0.1V | 3 | 13 | 26 | ns |
| | | | $V_{CC}$=1.5±0.1V | 3 | 9 | 17 | ns |
| | | | $V_{CC}$=1.8±0.15V | 3 | 8 | 13 | ns |
| | | | $V_{CC}$=2.5±0.2V | 3 | 6 | 9 | ns |
| | | | $V_{CC}$=3.3±0.3V | 3 | 5 | 7 | ns |

■ OPERATING CHARACTERISTICS (f=10MHz, $T_A$ =25°C, unless otherwise specified)

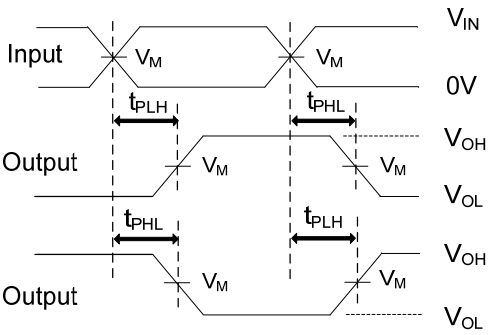
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Power Dissipation Capacitance | $C_{PD}$ | $V_{CC}$=0.8V | | 5.5 | | pF |
| | | $V_{CC}$=1.2±0.1V | | 5.5 | | pF |
| | | $V_{CC}$=1.5±0.1V | | 5.5 | | pF |
| | | $V_{CC}$=1.8±0.15V | | 5.5 | | pF |
| | | $V_{CC}$=2.5±0.2V | | 5.5 | | pF |
| | | $V_{CC}$=3.3±0.3V | | 5.5 | | pF |

## ■ TEST CIRCUIT AND WAVEFORMS

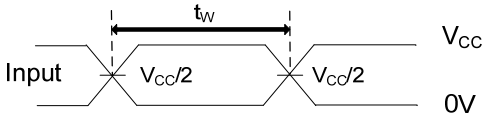



**TEST CIRCUIT**

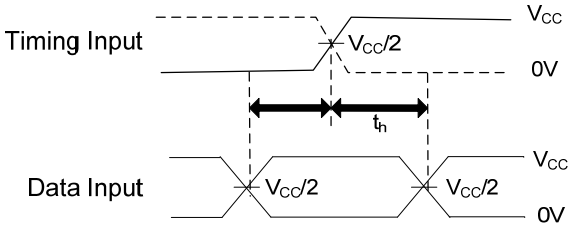
| $V_{CC}$ | $V_{IN}$ | $V_M$ | $C_L$ | $V_\triangle$ |
|---|---|---|---|---|
| 0.8 | $V_{CC}$ | $V_{CC}/2$ | 5,10,15,30pF | 0.1V |
| 1.2±0.1V | $V_{CC}$ | $V_{CC}/2$ | 5,10,15,30pF | 0.1V |
| 1.5±0.1V | $V_{CC}$ | $V_{CC}/2$ | 5,10,15,30pF | 0.1V |
| 1.8±0.15V | $V_{CC}$ | $V_{CC}/2$ | 5,10,15,30pF | 0.15V |
| 2.5±0.2V | $V_{CC}$ | $V_{CC}/2$ | 5,10,15,30pF | 0.15V |
| 3.3±0.3V | $V_{CC}$ | $V_{CC}/2$ | 5,10,15,30pF | 0.3V |




**PROPAGATION DELAY TIMES**




**PULSE DURATION**




**SETUP AND HOLD TIMES**

Notes: 1. $C_L$ includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, $Z_O$ = 50Ω, $t_r/t_f$=3ns.