



U74LVC06A

CMOS IC

HEX INVERTER BUFFERS/DRIVERS WITH OPEN-DRAIN OUTPUTS

DESCRIPTION

The **U74LVC06A** contain six independent inverter buffers/drivers with open drain outputs, and performs the Boolean function $Y = \overline{A}$ in positive logic.

This device has power-down protective circuit preventing destruction of the device when it is powered down.

FEATURES

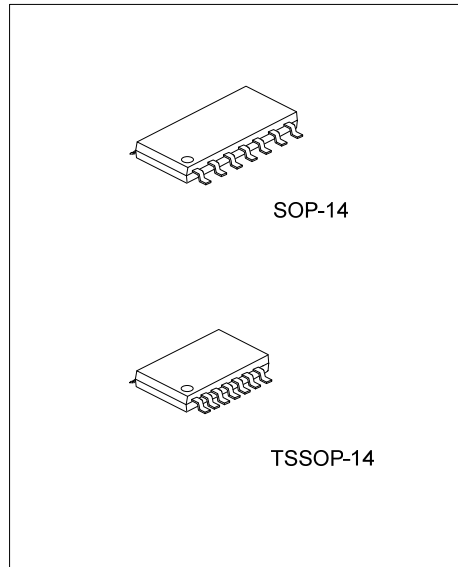
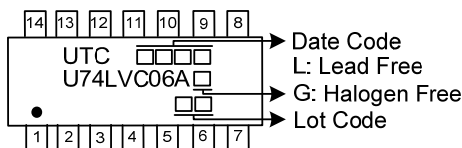
- * Operate From 1.65V to 3.6V
- * Inputs and Open-Drain Outputs Accept Voltages to 5.5V
- * I_{OFF} Supports Partial-Power-Down Mode
- * Low Power Dissipation

ORDERING INFORMATION

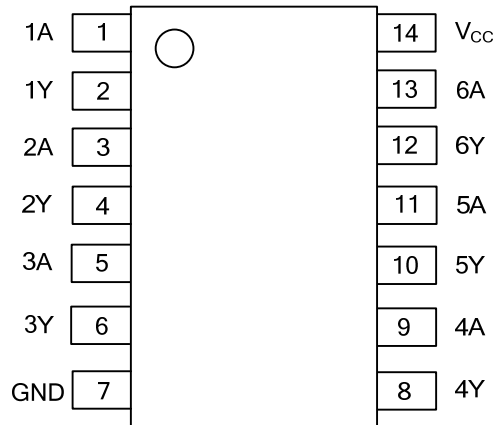
| Ordering Number | | Package | Packing |
|------------------|------------------|----------|-----------|
| Lead Free | Halogen Free | | |
| U74LVC06AL-S14-R | U74LVC06AG-S14-R | SOP-14 | Tape Reel |
| U74LVC06AL-P14-R | U74LVC06AG-P14-R | TSSOP-14 | Tape Reel |

| | |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <p>U74LVC06AG-S14-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p> | <p>(1) R: Tape Reel (2) S14: SOP-14, P14: TSSOP-14 (3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|

MARKING



■ PIN CONFIGURATION

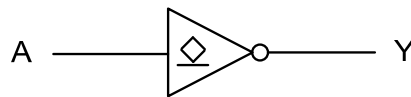


■ FUNCTION TABLE (Each Inverter)

| INPUT(A) | OUTPUT(Y) |
|----------|-----------|
| H | L |
| L | Z |

Note: H: HIGH voltage level; L: LOW voltage level; Z: high-impedance OFF-state.

■ LOGIC DIAGRAM (Each Inverter)



Logic Symbol

■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-------------------------------------------------------|-----------|-------------|------|
| Supply Voltage | V_{CC} | -0.5 ~ +6.5 | V |
| Input Voltage | V_{IN} | -0.5 ~ +6.5 | V |
| Output Voltage | V_{OUT} | -0.5 ~ +6.5 | V |
| V_{CC} or GND Current | I_{CC} | ±100 | mA |
| Continuous Output Current ($V_{OUT}=0$ to V_{CC}) | I_{OUT} | ±50 | mA |
| Input Clamp Current ($V_{IN}<0$) | I_{IK} | -50 | mA |
| Output Clamp Current ($V_{OUT}<0$) | I_{OK} | -50 | mA |
| Storage Temperature | 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.

■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|----------|---------|------|
| Junction to Ambient | SOP-14 | 86 | °C/W |
| | TSSOP-14 | 113 | °C/W |

■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|-----------|---------------------|------|-----|------|------|
| Supply Voltage | V_{CC} | Operating | 1.65 | | 3.6 | V |
| | | Data retention only | 1.5 | | | V |
| Input Voltage | V_{IN} | | 0 | | 5.5 | V |
| Output Voltage | V_{OUT} | | 0 | | 5.5 | V |
| Low-Level Output Current | I_{OL} | $V_{CC}=1.65V$ | | | 4 | mA |
| | | $V_{CC}=2.3V$ | | | 8 | mA |
| | | $V_{CC}=2.7V$ | | | 12 | mA |
| | | $V_{CC}=3V$ | | | 24 | mA |
| Operating Temperature | T_A | | -40 | | +125 | °C |

■ ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------|----------------------|-----|----------------------|------|
| High-Level Input Voltage | V_{IH} | $V_{CC}=1.65V \sim 1.95V$ | $0.65 \times V_{CC}$ | | | V |
| | | $V_{CC}=2.3V \sim 2.7V$ | 1.7 | | | V |
| | | $V_{CC}=2.7V \sim 3.6V$ | 2 | | | V |
| Low-Level Input Voltage | V_{IL} | $V_{CC}=1.65V \sim 1.95V$ | | | $0.35 \times V_{CC}$ | V |
| | | $V_{CC}=2.3V \sim 2.7V$ | | | 0.7 | V |
| | | $V_{CC}=2.7V \sim 3.6V$ | | | 0.8 | V |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=1.65 \sim 3.6V, I_{OL}=100\mu A$ | | | 0.2 | V |
| | | $V_{CC}=1.65V, I_{OL}=4mA$ | | | 0.45 | V |
| | | $V_{CC}=2.3V, I_{OL}=8mA$ | | | 0.7 | V |
| | | $V_{CC}=2.7V, I_{OL}=12mA$ | | | 0.4 | V |
| | | $V_{CC}=3.0V, I_{OL}=24mA$ | | | 0.55 | V |
| Input Leakage Current | $I_{I(LEAK)}$ | $V_{IN}=5.5V$ or GND, $V_{CC}=3.6V$ | | | ±1 | μA |
| Power OFF Leakage Current | I_{OFF} | V_{IN} or $V_{OUT}=5.5V, V_{CC}=0V$ | | | ±1 | μA |
| Quiescent Supply Current | I_Q | $V_{IN}=V_{CC}$ or GND, $I_{OUT}=0, V_{CC}=3.6V$ | | | 1 | μA |
| Additional Quiescent Supply Current Per Input Pin | ΔI_Q | $V_{CC}=2.7 \sim 3.6V$, One input at $V_{CC}-0.6V, I_{OUT}=0$, Other inputs at V_{CC} or GND | | | 500 | μA |
| Input Capacitance | C_{IN} | $V_{IN}=V_{CC}$ or GND, $V_{CC}=3.3V$ | | 5 | | pF |

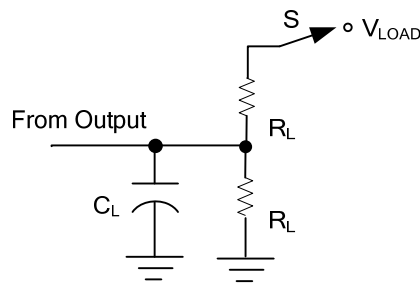
■ SWITCHING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT | |
|-------------------------------------------------|-------------------------------------|-------------------------------------------------|----------------------|-----|-----|------|----|
| Propagation delay from input (nA) to output(nY) | t _{PLZ} / t _{PZL} | V _{CC} =1.8±0.15V, R _L =1KΩ | C _L =30pF | 1.4 | | 5.1 | ns |
| | | V _{CC} =2.5±0.2V, R _L =500Ω | | 1.0 | | 2.8 | ns |
| | | V _{CC} =2.7V, R _L =500Ω | C _L =50pF | 1.0 | | 3.7 | ns |
| | | V _{CC} =3.3±0.3V, R _L =500Ω | | 1.0 | | 3.5 | ns |

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

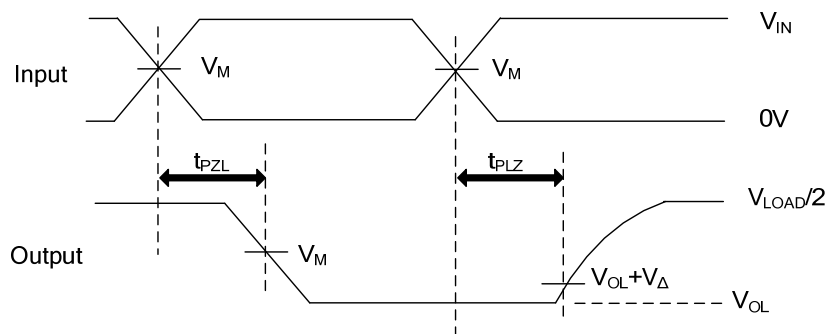
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------------------|-----------------|----------------------------|-----|-----|-----|------|
| Power Dissipation Capacitance Per Inverter | C _{PD} | V _{CC} =1.8±0.15V | | 2.1 | | pF |
| | | V _{CC} =2.5±0.2V | | 2.3 | | pF |
| | | V _{CC} =3.3±0.3V | | 2.5 | | pF |

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

| V_{CC} | INPUTS | | V_M | V_{LOAD} | V_{Δ} | C_L | R_L |
|------------------|----------|--------------|------------|-------------------|--------------|-------|--------------|
| | V_{IN} | t_R, t_F | | | | | |
| $1.8V \pm 0.15V$ | V_{CC} | $\leq 2ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 0.15V | 30pF | 1K Ω |
| $2.5V \pm 0.2V$ | V_{CC} | $\leq 2ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 0.15V | 30pF | 500 Ω |
| 2.7V | 2.7V | $\leq 2.5ns$ | 1.5V | 6V | 0.3V | 50pF | 500 Ω |
| $3.3V \pm 0.3V$ | 2.7V | $\leq 2.5ns$ | 1.5V | 6V | 0.3V | 50pF | 500 Ω |



ENABLE AND DISABLE TIMES

Note: C_L includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: PRR $\leq 10MHz$, $Z_o = 50\Omega$.

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