



U74LVC3G04

CMOS IC

TRIPLE INVERTER GATE

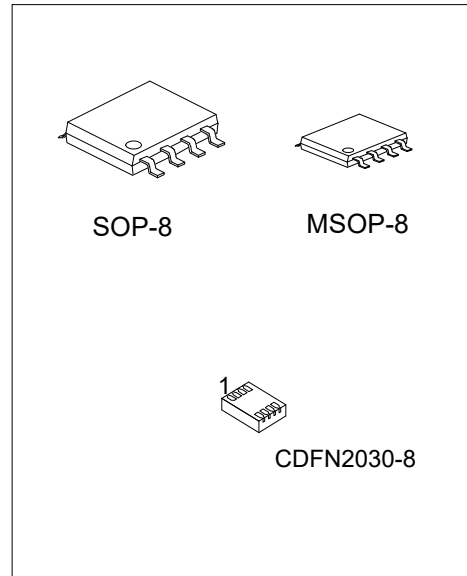
DESCRIPTION

The **U74LVC3G04** is a triple inverter gate which provides the Boolean function $Y = \bar{A}$.

This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

FEATURES

- * Wide supply voltage range from 1.65V to 5.5V
- * Inputs accept voltages up to 5.5V
- * I_{OFF} supports partial-power-down mode
- * Low static power consumption; $I_{CC}=10\mu A$ (Max.)



ORDERING INFORMATION

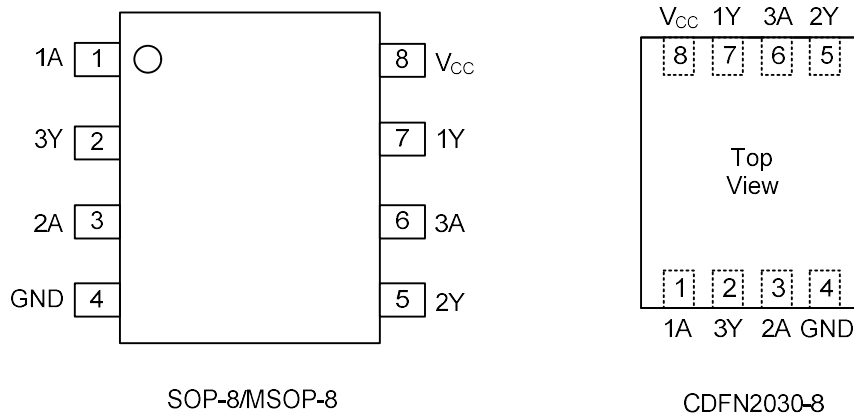
| Ordering Number | | Package | Packing |
|-------------------------|-------------------------|------------|-----------|
| Lead Free | Halogen Free | | |
| U74LVC3G04L-S08-R | U74LVC3G04G-S08-R | SOP-8 | Tape Reel |
| U74LVC3G04L-SM2-R | U74LVC3G04G-SM2-R | MSOP-8 | Tape Reel |
| U74LVC3G04L-CK08-2030-R | U74LVC3G04G-CK08-2030-R | CDFN2030-8 | Tape Reel |

| | |
|--|--|
| <p>U74LVC3G04G-S08-R</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package | <ul style="list-style-type: none"> (1) R: Tape Reel (2) S08: SOP-8, SM2: MSOP-8 CK08-2030: CDFN2030-8 (3) G: Halogen Free and Lead Free, L: Lead Free |
|--|--|

MARKING

| SOP-8 / MSOP-8 | CDFN2030-8 |
|--|--|
| <p>UTC □□□□ → Date Code L: Lead Free LVC3G04 □ → G: Halogen Free □□□□ → Lot Code</p> | <p>LVC 3G04 • □□□□ → Date Code</p> |

■ PIN CONFIGURATION

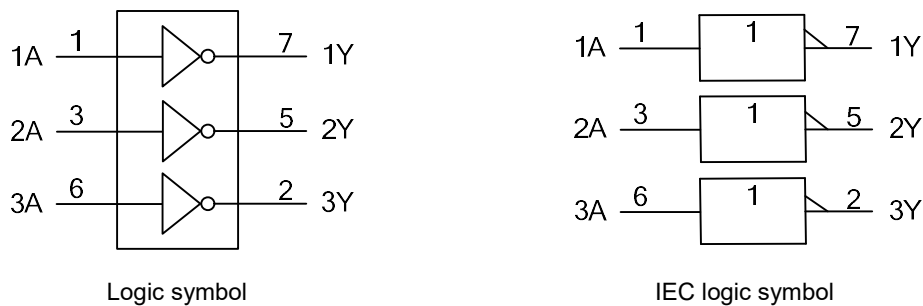


■ FUNCTION TABLE

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

Note: H: High voltage level; L: Low voltage level

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | CONDITIONS | RATINGS | UNIT |
|------------------------------------|-----------|----------------------------------|-----------------------|------|
| Supply Voltage | V_{CC} | | -0.5 ~ +6.5 | V |
| Input Voltage | V_{IN} | | -0.5 ~ +6.5 | 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 ~ +6.5 | V |
| Continuous V_{CC} or GND Current | I_{CC} | | ±100 | mA |
| Continuous Output Current | I_{OUT} | $V_{OUT}=0V \sim V_{CC}$ | ±50 | mA |
| Input Clamp Current | I_{IK} | $V_{IN}<0V$ | -50 | mA |
| Output Clamp Current | I_{OK} | $V_{OUT}>V_{CC}$ or $V_{OUT}<0V$ | -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 | 1.65 | | 5.5 | V |
| | | Data retention only | 1.5 | | | V |
| Input Voltage | V_{IN} | | 0 | | 5.5 | V |
| Output Voltage | V_{OUT} | High or low state | 0 | | V_{CC} | V |
| Input Transition Rise or Fall Rate | $\Delta t/\Delta v$ | $V_{CC}=1.8V\pm 0.15V, 2.5V\pm 0.2V$ | | | 20 | ns/V |
| | | $V_{CC}=3.3V\pm 0.3V$ | | | 10 | ns/V |
| | | $V_{CC}=5V\pm 0.5V$ | | | 5 | ns/V |
| Operating Temperature | T_A | | -40 | | +125 | °C |

Note: This condition is only determined from design. It can't be 100% tested in mass production.

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

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT | |
|---------------------------|----------|---|----------------------|-----|----------------------|------|---|
| High-level Input Voltage | V_{IH} | $V_{CC}=1.8\pm 0.15V$ | $0.65 \times V_{CC}$ | | | V | |
| | | $V_{CC}=2.5\pm 0.2V$ | 1.7 | | | V | |
| | | $V_{CC}=3.3\pm 0.3V$ | 2 | | | V | |
| | | $V_{CC}=5\pm 0.5V$ | $0.7 \times V_{CC}$ | | | V | |
| Low-level Input Voltage | V_{IL} | $V_{CC}=1.8\pm 0.15V$ | | | $0.35 \times V_{CC}$ | V | |
| | | $V_{CC}=2.5\pm 0.2V$ | | | 0.7 | V | |
| | | $V_{CC}=3.3\pm 0.3V$ | | | 0.8 | V | |
| | | $V_{CC}=5\pm 0.5V$ | | | $0.3 \times V_{CC}$ | V | |
| High-Level Output Voltage | V_{OH} | $V_{CC}=1.65 \sim 5.5V, I_{OH}=-100\mu A$ | $V_{CC}-0.1$ | | | V | |
| | | $V_{CC}=1.65V, I_{OH}=-4mA$ | 1.2 | | | V | |
| | | $V_{CC}=2.3V, I_{OH}=-8mA$ | 1.9 | | | V | |
| | | $V_{CC}=3.0V$ | $I_{OH}=-16mA$ | 2.4 | | | V |
| | | | $I_{OH}=-24mA$ | 2.3 | | | V |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=1.65 \sim 5.5V, I_{OL}=100\mu A$ | | | 0.1 | V | |
| | | $V_{CC}=1.65V, I_{OL}=4mA$ | | | 0.45 | V | |
| | | $V_{CC}=2.3V, I_{OL}=8mA$ | | | 0.3 | V | |
| | | $V_{CC}=3.0V$ | $I_{OL}=16mA$ | | | 0.4 | V |
| | | | $I_{OL}=24mA$ | | | 0.55 | V |
| | | $V_{CC}=4.5V, I_{OL}=32mA$ | | | 0.55 | V | |

■ ELECTRICAL CHARACTERISTICS (Cont.)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|-----------------|---|-----|-----|----------|---------|
| Input Leakage Current | $I_{I(LEAK)}$ | $V_{CC}=0 \sim 5.5V, V_{IN}=5.5V$ or GND | | | ± 5 | μA |
| Power OFF Leakage Current | I_{off} | $V_{CC}=0V, V_{IN}$ or $V_{OUT}=5.5V$ | | | ± 10 | μA |
| Quiescent Supply Current | I_{CC} | $V_{CC}=1.65 \sim 5.5V,$ $V_{IN}=V_{CC}$ or GND, $I_{OUT}=0A$ | | | 10 | μA |
| Additional Quiescent Supply Current Per Input Pin | ΔI_{CC} | $V_{CC}=3 \sim 5.5V,$ One input at $V_{CC}-0.6V,$ Other inputs at V_{CC} or GND | | | 500 | μA |
| Input Capacitance | C_I | $V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND | | 3.5 | | pF |

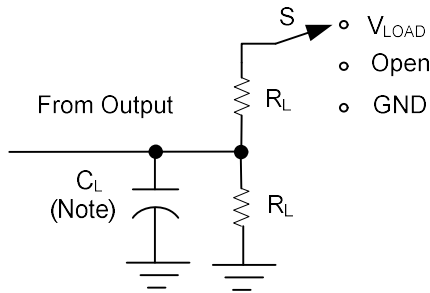
■ SWITCHING CHARACTERISTICS ($T_A=25^\circ C$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|----------|---|-----|-----|-----|------|
| Propagation delay from input (A) to output(Y) | t_{PD} | $V_{CC}=1.8\pm 0.15V, C_L=30pF, R_L=1k\Omega$ | 3.2 | | 7.9 | ns |
| | | $V_{CC}=2.5\pm 0.2V, C_L=30pF, R_L=500\Omega$ | 1.5 | | 4.4 | ns |
| | | $V_{CC}=3.3\pm 0.3V, C_L=50pF, R_L=500\Omega$ | 1.4 | | 4.1 | ns |
| | | $V_{CC}=5\pm 0.5V, C_L=50pF, R_L=500\Omega$ | 1.1 | | 3.2 | ns |

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

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|----------|-----------------|-----|-----|-----|------|
| Power Dissipation Capacitance | C_{PD} | $V_{CC}=1.8V$ | | 16 | | pF |
| | | $V_{CC}=2.5V$ | | 16 | | pF |
| | | $V_{CC}=3.3V$ | | 16 | | pF |
| | | $V_{CC}=5V$ | | 18 | | pF |

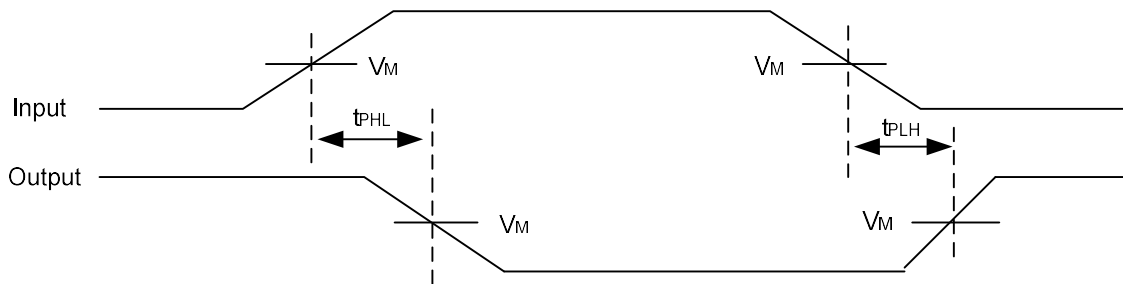
■ TEST CIRCUIT AND WAVEFORMS



| TEST | S |
|-------------------|------------|
| t_{PLH}/t_{PHL} | Open |
| t_{PLZ}/t_{PZL} | V_{LOAD} |
| t_{PHZ}/t_{PZH} | GND |

Note: C_L includes probe and jig capacitance.

| V_{CC} | V_{IN} | t_R / t_F | V_M | C_L | R_L | V_{Δ} |
|------------------|----------|--------------|------------|-------|--------------|--------------|
| $1.8V \pm 0.15V$ | V_{CC} | $\leq 2ns$ | $V_{CC}/2$ | 30pF | 1K Ω | 0.15V |
| $2.5V \pm 0.2V$ | V_{CC} | $\leq 2ns$ | $V_{CC}/2$ | 30pF | 500 Ω | 0.15V |
| $3.3V \pm 0.3V$ | 3V | $\leq 2.5ns$ | 1.5V | 50pF | 500 Ω | 0.3V |
| $5V \pm 0.5V$ | V_{CC} | $\leq 2.5ns$ | $V_{CC}/2$ | 50pF | 500 Ω | 0.3V |



Notes: 1. C_L includes probe and jig capacitance.

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

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