

DUAL SCHMITT-TRIGGER INVERTER

1. Description

The FLH **74LVC2G14** is a high-performance, low-power, low-voltage, Si-gate CMOS device which provides two inverters with Schmitt trigger action. It is capable of transforming slowly changed input signals into sharply defined, jitter-free output signals.

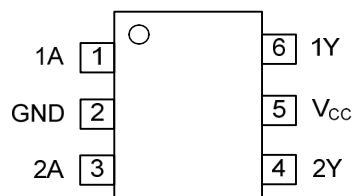
2. Features

- Operate From 1.65V to 5.5V
- 5V Tolerant Input/Output for Interfacing with 5V logic
- $\pm 24\text{mA}$ Output Drive ($V_{CC} = 3.3\text{V}$)
- CMOS Low-Power Consumption and High Noise Immunity
- Halogen Free

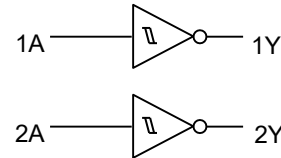
3. Applications

- Voltage Level Shifting
- General Purpose Logic
- Power Down Signal Isolation

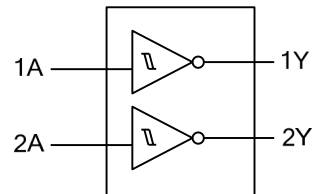
4. Pinning



5. Logic Diagram



6. Logic Symbol



7. Pinning Description

| Pin Name | Pin Number | Function |
|----------|------------|----------------|
| 1A | 1 | Data Input |
| GND | 2 | Ground |
| 2A | 3 | Data Input |
| 2Y | 4 | Data Output |
| V | 5 | Supply Voltage |
| 1Y | 6 | Data Output |

8. Function Table

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

H=High level

L=Low Level

9. Ordering Information

| Part Number | Description | Package Type | Packing | SPQ |
|------------------|----------------------------|-----------------|-----------|-----|
| 74LVC2G14L-AL6-R | Lead Free | SOT-363 | Tape Reel | |
| 74LVC2G14G-AL6-R | Halogen Free and Lead Free | SOT-363 | Tape Reel | |
| 74LVC2G14L-AG6-R | Lead Free | SOT-26/SOT-23-6 | Tape Reel | |
| 74LVC2G14G-AG6-R | Halogen Free and Lead Free | SOT-26/SOT-23-6 | Tape Reel | |

10. ABSOLUTE MAXIMUM RATING

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

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------------|----------------|---------------------|--------------------|
| Supply Voltage | V_{CC} | -0.5 ~ +6.5 | V |
| Input Voltage | V_{IN} | -0.5 ~ +6.5 | V |
| Output Voltage | High-impedance | -0.5 ~ 6.5 | V |
| | Power-off | | |
| | High State | -0.5 ~ $V_{CC}+0.5$ | V |
| | Low State | | |
| V_{CC} or GND Current | I_{CC} | ± 100 | mA |
| Continuous Output Current | I_O | ± 50 | mA |
| Input Clamp Current | I_{IK} | -50 | mA |
| Output Clamp Current | I_{OK} | -50 | mA |
| Storage Temperature | T_{STG} | -65 ~ + 150 | $^{\circ}\text{C}$ |

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.

11. THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|---------|---------|----------------------|
| Junction to Ambient | SOT-363 | 350 | $^{\circ}\text{C/W}$ |
| | SOT-26 | 230 | |

12. RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------|-----------|-----------------------|------|-----|----------|--------------------|
| Supply Voltage | V_{CC} | | 1.65 | | 5.5 | V |
| Control Input Voltage | V_{IN} | | 0 | | 5.5 | V |
| Output Voltage | V_{OUT} | High or low state | 0 | | V_{CC} | V |
| High Level Output Current | I_{OH} | $V_{CC}=1.65\text{V}$ | | | -4 | mA |
| | | $V_{CC}=2.3\text{V}$ | | | -8 | mA |
| | | $V_{CC}=3\text{V}$ | | | -16 | mA |
| | | $V_{CC}=3\text{V}$ | | | -24 | mA |
| | | $V_{CC}=4.5\text{V}$ | | | -32 | mA |
| Low Level Output Current | I_{OL} | $V_{CC}=1.65\text{V}$ | | | 4 | mA |
| | | $V_{CC}=2.3\text{V}$ | | | 8 | mA |
| | | $V_{CC}=3\text{V}$ | | | 16 | mA |
| | | $V_{CC}=3\text{V}$ | | | 24 | mA |
| | | $V_{CC}=4.5\text{V}$ | | | 32 | mA |
| Operating Temperature | T_{OPR} | | -40 | | +125 | $^{\circ}\text{C}$ |

13. ELECTRICAL CHARACTERISTICS

 (T_A=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|----------------------|---|----------------------|------|------|------|
| Positive-Going Input Threshold Voltage | VT+ | V _{CC} =1.65V | 0.70 | 1.24 | 1.40 | V |
| | | V _{CC} =2.3V | 1.00 | 1.54 | 1.70 | V |
| | | V _{CC} =3V | 1.30 | 1.86 | 2.20 | V |
| | | V _{CC} =4.5V | 1.90 | 2.59 | 3.10 | V |
| | | V _{CC} =5.5V | 2.20 | 3.08 | 3.70 | V |
| Negative-Going Input Threshold Voltage | VT- | V _{CC} =1.65V | 0.30 | 0.57 | 0.70 | V |
| | | V _{CC} =2.3V | 0.40 | 0.82 | 1.00 | V |
| | | V _{CC} =3V | 0.60 | 1.15 | 1.30 | V |
| | | V _{CC} =4.5V | 1.10 | 1.73 | 2.00 | V |
| | | V _{CC} =5.5V | 1.40 | 2.13 | 2.50 | V |
| Hysteresis Voltage (VT+ - VT-) | ΔVT | V _{CC} =1.65V | 0.30 | 0.67 | 0.80 | V |
| | | V _{CC} =2.3V | 0.40 | 0.72 | 0.90 | V |
| | | V _{CC} =3V | 0.40 | 0.71 | 1.10 | V |
| | | V _{CC} =4.5V | 0.60 | 0.86 | 1.30 | V |
| | | V _{CC} =5.5V | 0.70 | 0.95 | 1.40 | V |
| High-Level Output Voltage | V _{OH} | V _{CC} =1.65~5.5V, I _{OH} =-100uA | V _{CC} -0.1 | | | V |
| | | V _{CC} =1.65V, I _{OH} =-4mA | 1.20 | | | V |
| | | V _{CC} =2.3V, I _{OH} =-8mA | 1.90 | | | V |
| | | V _{CC} =3V, I _{OH} =-16mA | 2.40 | | | V |
| | | V _{CC} =3V, I _{OH} =-24mA | 2.30 | | | V |
| | | V _{CC} =4.5V, I _{OH} =-32mA | 3.80 | | | V |
| Low-Level Output Voltage | V _{OL} | V _{CC} =1.65~5.5V, I _{OL} =100uA | | | 0.10 | V |
| | | V _{CC} =1.65V, I _{OL} =4mA | | | 0.45 | V |
| | | V _{CC} =2.3V, I _{OL} =8mA | | | 0.30 | V |
| | | V _{CC} =3V, I _{OL} =16mA | | | 0.40 | V |
| | | V _{CC} =3V, I _{OL} =24mA | | | 0.55 | V |
| | | V _{CC} =4.5V, I _{OL} =32mA | | | 0.55 | V |
| Input Leakage Current | I _{I(LEAK)} | V _{CC} =0V to 5.5V, V _{IN} =0 or 5.5V | | | ±5 | μA |
| Power OFF Leakage Current | I _{OFF} | V _{CC} =0V, V _{IN} or V _{OUT} =5.5V, | | | ±10 | μA |
| Quiescent Supply Current | I _Q | V _{CC} =1.65V to 5.5V, I _{OUT} =0 V _{IN} =5.5V or GND | | 0.1 | 10 | μA |
| Additional Quiescent Supply Current Per Pin | ΔI _Q | V _{CC} =3V to 5.5V One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND, I _{OUT} =0 | | | 500 | μA |
| Input Capacitance | C _{IN} | V _{CC} =3.3V, V _{IN} =V _{CC} or GND | | 4 | | pF |

14. 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 _{PLH} / t _{PHL} | V _{CC} = 1.8V±0.15V, V _{IN} =V _{CC} C _L =30pF, R _L =1KΩ | 3.90 | | 9.50 | ns |
| | | V _{CC} =2.5V±0.2V, V _{IN} =V _{CC} C _L =30pF, R _L =500Ω | 1.90 | | 5.70 | ns |
| | | V _{CC} = 3.3V±0.3V, V _{IN} =3V C _L =50pF, R _L =500Ω | 2.00 | | 5.40 | ns |
| | | V _{CC} =5V±0.5V, V _{IN} =V _{CC} C _L =50pF, R _L =500Ω | 1.5 | | 4.3 | ns |

15. OPERATING CHARACTERISTICS

(T_A=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|-----------------|--------------------------------|-----|-----|-----|------|
| Power Dissipation Capacitance | C _{PD} | V _{CC} =1.8V, f=10MHz | | 16 | | pF |
| | | V _{CC} =2.5V, f=10MHz | | 17 | | pF |
| | | V _{CC} =3.3V, f=10MHz | | 18 | | pF |
| | | V _{CC} =5V, f=10MHz | | 21 | | pF |

16. TEST CIRCUITS AND WAVEFORMS

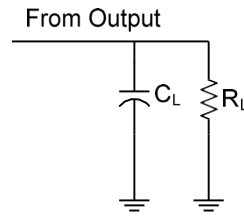


Fig. 1. TEST CIRCUIT

| V _{CC} | Inputs | | V _M | C _L | R _L |
|-----------------|-----------------|---------------------------------|--------------------|----------------|----------------|
| | V _{IN} | t _R , t _F | | | |
| 1.8V±0.15V | V _{CC} | ≤2ns | V _{CC} /2 | 30pF | 1kΩ |
| 2.5V±0.2V | V _{CC} | ≤2ns | V _{CC} /2 | 30pF | 500Ω |
| 3.3V±0.3V | 3V | ≤2.5ns | 1.5V | 50pF | 500Ω |
| 5V±0.5V | V _{CC} | ≤2.5ns | V _{CC} /2 | 50pF | 500Ω |

Note: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR≤1MHz, Z_O = 50Ω: t_R≤2ns,

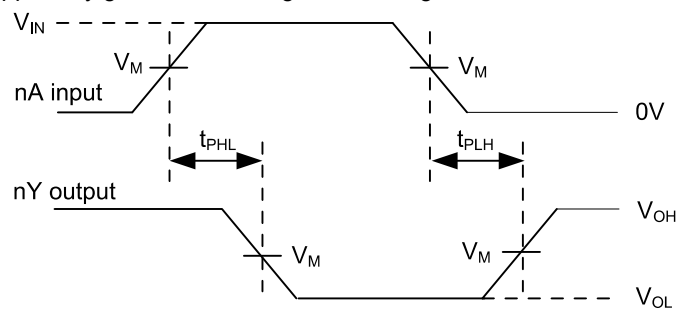


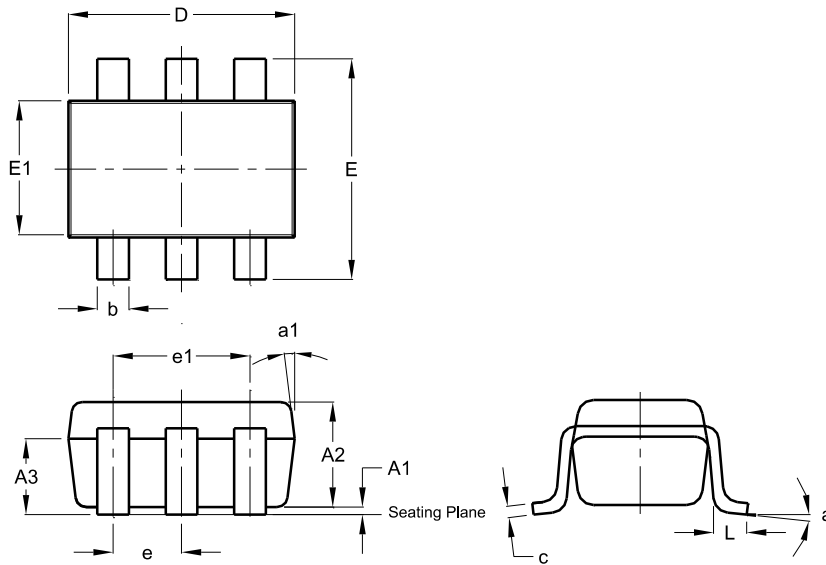
Fig. 2. PROPAGATION DELAY TIMES

t_F ≤ 2ns (V_{CC} = 1.8V ± 0.15V and V_{CC} = 2.5V ± 0.2V)

t_R ≤ 2.5ns, t_F ≤ 2.5ns (V_{CC} = 3.3V ± 0.3V and V_{CC} = 5V ± 0.5V)

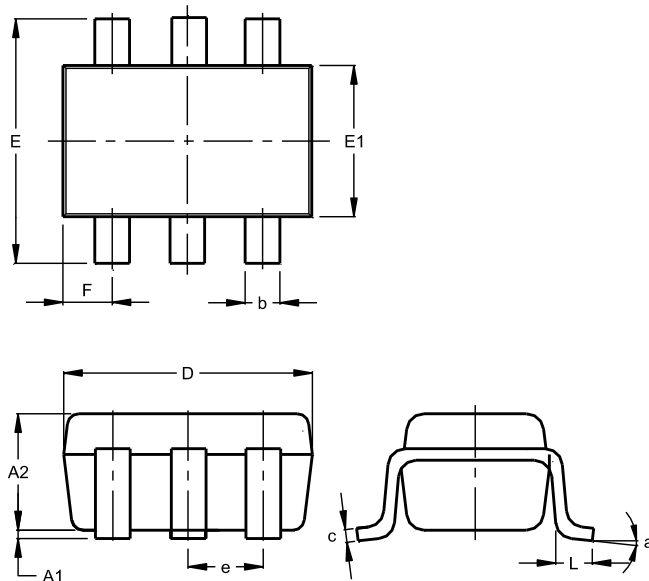
17. Package Outlines

SOT-26



| SOT26 | | | |
|----------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A1 | 0.013 | 0.10 | 0.05 |
| A2 | 1.00 | 1.30 | 1.10 |
| A3 | 0.70 | 0.80 | 0.75 |
| b | 0.35 | 0.50 | 0.38 |
| c | 0.10 | 0.20 | 0.15 |
| D | 2.90 | 3.10 | 3.00 |
| e | - | - | 0.95 |
| e1 | - | - | 1.90 |
| E | 2.70 | 3.00 | 2.80 |
| E1 | 1.50 | 1.70 | 1.60 |
| L | 0.35 | 0.55 | 0.40 |
| a | - | - | 8° |
| a1 | - | - | 7° |
| All Dimensions in mm | | | |

SOT-363



| SOT363 | | | |
|----------------------|-----------|------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 0.95 |
| b | 0.10 | 0.30 | 0.25 |
| c | 0.10 | 0.22 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| F | 0.40 | 0.45 | 0.425 |
| L | 0.25 | 0.40 | 0.30 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

18. Disclaimers

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