



# U74LVC1G126

**CMOS IC**

## BUS BUFFER/LINE DRIVER; 3-STATE

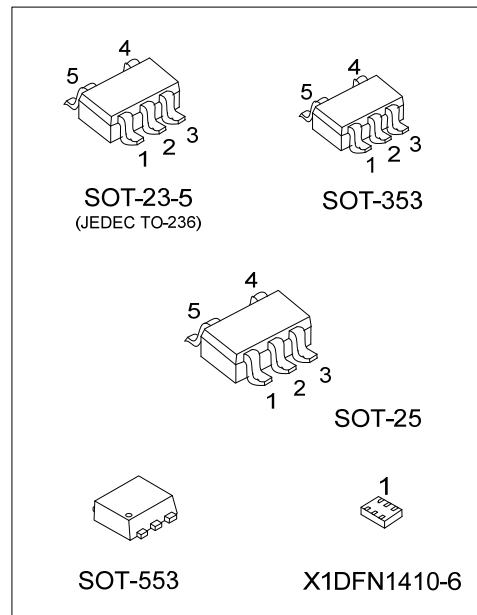
### DESCRIPTION

The **U74LVC1G126** is single bus buffer/line driver with 3-state output. The output is disabled When the output enable (OE) is low. When OE is high, true data is will pass A input to the Y output.

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

### FEATURES

- \* Operate From 1.65V to 5.5V
- \* Inputs Accept Voltages to 5.5V
- \* High Noise Immunity
- \* Low Power Dissipation
- \* Direct Interface With TTL level



### ORDERING INFORMATION

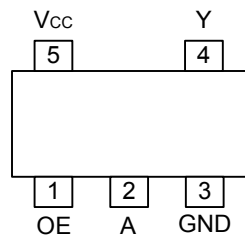
| Ordering Number           |                           | Package     | Packing   |
|---------------------------|---------------------------|-------------|-----------|
| Lead Free                 | Halogen Free              |             |           |
| U74LVC1G126L-AE5-R        | U74LVC1G126G-AE5-R        | SOT-23-5    | Tape Reel |
| U74LVC1G126L-AF5-R        | U74LVC1G126G-AF5-R        | SOT-25      | Tape Reel |
| U74LVC1G126L-AL5-R        | U74LVC1G126G-AL5-R        | SOT-353     | Tape Reel |
| U74LVC1G126L-AN5-R        | U74LVC1G126G-AN5-R        | SOT-553     | Tape Reel |
| U74LVC1G126L-K06-1410X1-R | U74LVC1G126G-K06-1410X1-R | X1DFN1410-6 | Tape Reel |

|   |  |
|---|--|
| <p>U74LVC1G126G-AE5-R</p> <p>(1)Packing Type<br/>(2)Package Type<br/>(3)Green Package</p> | <p>(1) R: Tape Reel<br/>(2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353<br/>AN5: SOT-553, K06-1410X1: X1DFN1410-6<br/>(3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|---|--|

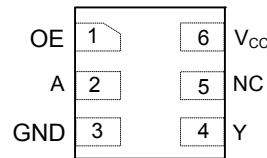
### MARKING

| SOT-23-5 / SOT-25 / SOT-353 / SOT-553   | X1DFN1410-6                             |
|---|---|
| <p>L: Lead Free<br/>G: Halogen Free</p> | <p>L: Lead Free<br/>G: Halogen Free</p> |

■ PIN CONFIGURATION



SOT-23-5 / SOT-25  
SOT-353 / SOT-553



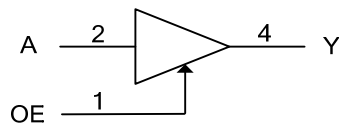
X1DFN1410-6  
(TOP VIEW)

■ FUNCTION TABLE

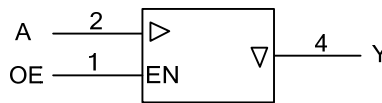
| INPUT(OE) | INPUT(A) | OUTPUT(Y) |
|-----------|----------|-----------|
| H         | L        | L         |
| H         | H        | H         |
| L         | X        | Z         |

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

■ LOGIC DIAGRAM (Positive Logic)



Logic Symbol



IEC 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   | Enable mode     | $V_{OUT}$ | -0.5 ~ $V_{CC} + 0.5$ | V           |
|  | Disable mode    |           | -0.5 ~ +6.5           | V           |
|  | Power-down mode |           | -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 ( $V_{OUT}>V_{CC}$ or $V_{OUT}<0$ )       |                 | $I_{OK}$  | -50                   | mA          |
| Power Dissipation<br>( $T_A=-40^{\circ}C \sim +125^{\circ}C$ ) | SOT-23-5        | $P_D$     | 300                   | mW          |
|  | SOT-25          |           | 360                   | mW          |
|  | SOT-353         |           | 250                   | mW          |
|  | SOT-553         |           | 210                   | mW          |
|  | X1DFN1410-6     |           | 200                   | mW          |
| Storage Temperature  |                 | $T_{STG}$ | -65 ~ +150            | $^{\circ}C$ |

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           |
| Input Voltage                      | $V_{IN}$    |   | 0    |     | 5.5      | V           |
| Output Voltage                     | $V_{OUT}$   | $V_{CC}=1.65V \sim 5.5V$ ; Enable mode  | 0    |     | $V_{CC}$ | V           |
|                                    |             | $V_{CC}=1.65V \sim 5.5V$ ; Disable mode | 0    |     | 5.5      | V           |
|                                    |             | $V_{CC}=0V$ ; Power-Down Mode           | 0    |     | 5.5      | V           |
| Input Transition Rise or Fall Rate | $t_R / t_F$ | $V_{CC}=1.65V \sim 2.7V$                |      |     | 20       | ns/V        |
|                                    |             | $V_{CC}=2.7V \sim 5.5V$                 |      |     | 10       | ns/V        |
| Operating Temperature              | $T_A$       |   | -40  |     | +125     | $^{\circ}C$ |

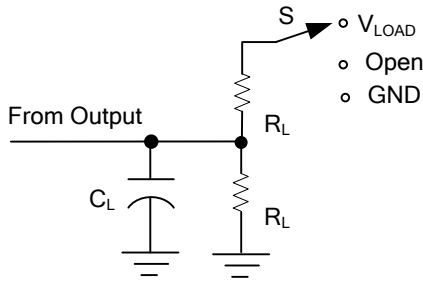
■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

| PARAMETER   | SYMBOL               | TEST CONDITIONS   | T <sub>A</sub> =25°C     |      |                          | T <sub>A</sub> =-40°C~+125°C |     |                          | UNIT |
|---|----------------------|---|--------------------------|------|--------------------------|------------------------------|-----|--------------------------|------|
|   |                      |   | MIN                      | TYP  | MAX                      | MIN                          | TYP | MAX                      |      |
| High-Level Input Voltage                          | V <sub>IH</sub>      | V <sub>CC</sub> =1.65V ~ 1.95V  | 0.65×<br>V <sub>CC</sub> |      |                          | 0.65×<br>V <sub>CC</sub>     |     |                          | V    |
|   |                      | V <sub>CC</sub> =2.3V ~ 2.7V  | 1.7                      |      |                          | 1.7                          |     |                          | V    |
|   |                      | V <sub>CC</sub> =2.7V ~ 3.6V  | 2                        |      |                          | 2                            |     |                          | V    |
|   |                      | V <sub>CC</sub> =4.5V ~ 5.5V  | 0.7×<br>V <sub>CC</sub>  |      |                          | 0.7×<br>V <sub>CC</sub>      |     |                          | V    |
| Low-Level Input Voltage                           | V <sub>IL</sub>      | V <sub>CC</sub> =1.65V ~ 1.95V  |                          |      | 0.35×<br>V <sub>CC</sub> |                              |     | 0.35×<br>V <sub>CC</sub> | V    |
|   |                      | V <sub>CC</sub> =2.3V ~ 2.7V  |                          |      | 0.7                      |                              |     | 0.7                      | V    |
|   |                      | V <sub>CC</sub> =2.7V ~ 3.6V  |                          |      | 0.8                      |                              |     | 0.8                      | V    |
|   |                      | V <sub>CC</sub> =4.5V ~ 5.5V  |                          |      | 0.3×<br>V <sub>CC</sub>  |                              |     | 0.3×<br>V <sub>CC</sub>  | V    |
| High-Level Output Voltage                         | V <sub>OH</sub>      | V <sub>CC</sub> =1.65 ~ 5.5V, I <sub>OH</sub> =-100μA   | V <sub>CC</sub> -<br>0.1 |      |                          | V <sub>CC</sub> -<br>0.1     |     |                          | V    |
|   |                      | V <sub>CC</sub> =1.65V, I <sub>OH</sub> =-4mA   | 1.2                      |      |                          | 0.95                         |     |                          | V    |
|   |                      | V <sub>CC</sub> =2.3V, I <sub>OH</sub> =-8mA  | 1.9                      |      |                          | 1.7                          |     |                          | V    |
|   |                      | V <sub>CC</sub> =2.7V, I <sub>OH</sub> =-12mA   | 2.2                      |      |                          | 1.9                          |     |                          | V    |
|   |                      | V <sub>CC</sub> =3.0V, I <sub>OH</sub> =-24mA   | 2.3                      |      |                          | 2.0                          |     |                          | V    |
|   |                      | V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-32mA   | 3.8                      |      |                          | 3.4                          |     |                          | V    |
| Low-Level Output Voltage                          | V <sub>OL</sub>      | V <sub>CC</sub> =1.65 ~ 5.5V, I <sub>OL</sub> =100μA  |                          |      | 0.1                      |                              |     | 0.1                      | V    |
|   |                      | V <sub>CC</sub> =1.65V, I <sub>OL</sub> =4mA  |                          |      | 0.45                     |                              |     | 0.7                      | V    |
|   |                      | V <sub>CC</sub> =2.3V, I <sub>OL</sub> =8mA   |                          |      | 0.3                      |                              |     | 0.45                     | V    |
|   |                      | V <sub>CC</sub> =2.7V, I <sub>OL</sub> =12mA  |                          |      | 0.4                      |                              |     | 0.6                      | V    |
|   |                      | V <sub>CC</sub> =3.0V, I <sub>OL</sub> =24mA  |                          |      | 0.55                     |                              |     | 0.8                      | V    |
|   |                      | V <sub>CC</sub> =4.5V, I <sub>OL</sub> =32mA  |                          |      | 0.55                     |                              |     | 0.8                      | V    |
| Input Leakage Current                             | I <sub>I(LEAK)</sub> | V <sub>CC</sub> =5.5V, V <sub>IN</sub> =5.5V or GND   |                          | ±0.1 | ±5                       |                              |     | ±5                       | μA   |
| Power OFF Leakage Current                         | I <sub>OFF</sub>     | V <sub>CC</sub> =0V, V <sub>IN</sub> or V <sub>OUT</sub> =5.5V  |                          | ±0.1 | ±10                      |                              |     | ±10                      | μA   |
| 3-State Output OFF-State Current                  | I <sub>OZ</sub>      | V <sub>CC</sub> =5.5V V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> ,<br>V <sub>OUT</sub> =V <sub>CC</sub> or GND |                          | ±0.1 | ±10                      |                              |     | ±10                      | μA   |
| Quiescent Supply Current                          | I <sub>CC</sub>      | V <sub>CC</sub> =5.5V, V <sub>IN</sub> =V <sub>CC</sub> or GND,<br>I <sub>OUT</sub> =0                                  |                          | 0.1  | 10                       |                              |     | 10                       | μA   |
| Additional Quiescent Supply Current Per Input Pin | ΔI <sub>CC</sub>     | V <sub>CC</sub> =2.3 ~ 5.5V,<br>V <sub>IN</sub> =V <sub>CC</sub> -0.6V, I <sub>OUT</sub> =0                             |                          | 5    | 500                      |                              |     | 500                      | μA   |

■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

| PARAMETER   | SYMBOL                              | TEST CONDITIONS                               | T <sub>A</sub> =25°C                               |     |     | T <sub>A</sub> =-40°C~+125°C |     |     | UNIT |    |
|---|-------------------------------------|---|--|-----|-----|------------------------------|-----|-----|------|----|
|   |                                     |   | MIN  | TYP | MAX | MIN                          | TYP | MAX |      |    |
| Propagation Delay From Input (A) to Output (Y)            | t <sub>PLH</sub> / t <sub>PHL</sub> | C <sub>L</sub> =30pF                          | V <sub>CC</sub> =1.8±0.15V,<br>R <sub>L</sub> =1KΩ | 1.0 |     | 16                           |     |     | 20   | ns |
|   |                                     |   | V <sub>CC</sub> =2.5±0.2V,<br>R <sub>L</sub> =500Ω | 0.5 |     | 10                           |     |     | 14   | ns |
|   |                                     | C <sub>L</sub> =50pF,<br>R <sub>L</sub> =500Ω | V <sub>CC</sub> =2.7V                              | 0.5 |     | 10                           |     |     | 14   | ns |
|   |                                     |   | V <sub>CC</sub> =3.3±0.3V                          | 0.5 |     | 7                            |     |     | 11   | ns |
|   |                                     |   | V <sub>CC</sub> =5±0.5V                            | 0.5 |     | 5                            |     |     | 9    | ns |
| 3-State Output Enable Time From Input (OE) to Output (Y)  | t <sub>PZH</sub> / t <sub>PZL</sub> | C <sub>L</sub> =30pF                          | V <sub>CC</sub> =1.8±0.15V,<br>R <sub>L</sub> =1KΩ | 1.0 |     | 18                           |     |     | 22   | ns |
|   |                                     |   | V <sub>CC</sub> =2.5±0.2V,<br>R <sub>L</sub> =500Ω | 0.5 |     | 11                           |     |     | 14   | ns |
|   |                                     | C <sub>L</sub> =50pF,<br>R <sub>L</sub> =500Ω | V <sub>CC</sub> =2.7V                              | 0.5 |     | 11                           |     |     | 14   | ns |
|   |                                     |   | V <sub>CC</sub> =3.3±0.3V                          | 0.5 |     | 7                            |     |     | 11   | ns |
|   |                                     |   | V <sub>CC</sub> =5±0.5V                            | 0.5 |     | 6                            |     |     | 9    | ns |
| 3-State Output Disable Time From Input (OE) to Output (Y) | t <sub>PLZ</sub> / t <sub>PHZ</sub> | C <sub>L</sub> =30pF                          | V <sub>CC</sub> =1.8±0.15V,<br>R <sub>L</sub> =1KΩ | 1.0 |     | 10                           |     |     | 13   | ns |
|   |                                     |   | V <sub>CC</sub> =2.5±0.2V,<br>R <sub>L</sub> =500Ω | 0.5 |     | 7                            |     |     | 10   | ns |
|   |                                     | C <sub>L</sub> =50pF,<br>R <sub>L</sub> =500Ω | V <sub>CC</sub> =2.7V                              | 0.5 |     | 7                            |     |     | 9    | ns |
|   |                                     |   | V <sub>CC</sub> =3.3±0.3V                          | 0.5 |     | 6                            |     |     | 8    | ns |
|   |                                     |   | V <sub>CC</sub> =5±0.5V                            | 0.5 |     | 5                            |     |     | 7    | ns |

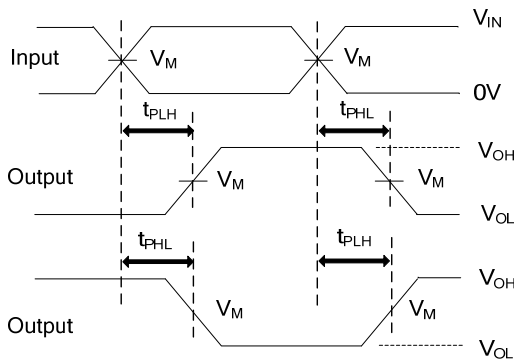
## TEST CIRCUIT AND WAVEFORMS



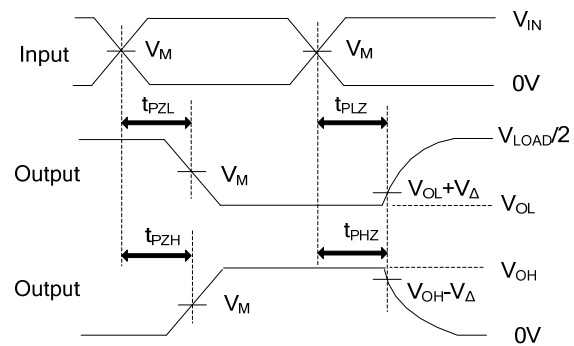
| TEST              | S          |
|-------------------|------------|
| $t_{PLH}/t_{PHL}$ | Open       |
| $t_{PHZ}/t_{PZH}$ | GND        |
| $t_{PLZ}/t_{PZL}$ | $V_{LOAD}$ |

TEST CIRCUIT

| $V_{CC}$         | INPUTS   |              | $V_M$      | $V_{LOAD}$        | $V_{\Delta}$ | $C_L$ | $R_L$        |
|------------------|----------|--------------|------------|-------------------|--------------|-------|--------------|
|                  | $V_{IN}$ | $t_R, t_F$   |            |                   |              |       |              |
| $1.8V \pm 0.15V$ | $V_{CC}$ | $\leq 2ns$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 0.15V        | 30pF  | 1K $\Omega$  |
| $2.5V \pm 0.2V$  | $V_{CC}$ | $\leq 2ns$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 0.15V        | 30pF  | 500 $\Omega$ |
| 2.7V             | 2.7V     | $\leq 2.5ns$ | 1.5V       | 6V                | 0.3V         | 50pF  | 500 $\Omega$ |
| $3.3V \pm 0.3V$  | 2.7V     | $\leq 2.5ns$ | 1.5V       | 6V                | 0.3V         | 50pF  | 500 $\Omega$ |
| $5V \pm 0.5V$    | $V_{CC}$ | $\leq 2.5ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 0.3V         | 50pF  | 500 $\Omega$ |



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Notes: 1.  $C_L$  includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics:  $P_{RR} \leq 10MHz$ ,  $Z_O = 50\Omega$ .

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