



## U74LVC1G19

CMOS IC

### 1-OF-2

### DECODER/DEMULTIPLEXER

#### DESCRIPTION

The **U74LVC1G19** is a 1-of-2 decoder / demultiplexer with a common output enable. This device buffers the data on input A and passes it to the outputs 1Y and 2Y when the enable input signal is LOW.

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

#### FEATURES

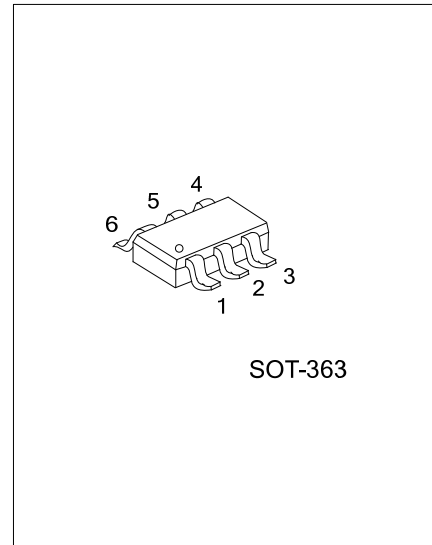
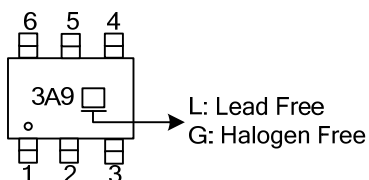
- \* Operate from 1.65V to 5.5V
- \* Inputs accept voltages to 5.5V
- \* Low power dissipation,  $I_{CC}=10\mu A$  (Max)
- \*  $\pm 24mA$  output drive( $V_{CC}=3V$ )

#### ORDERING INFORMATION

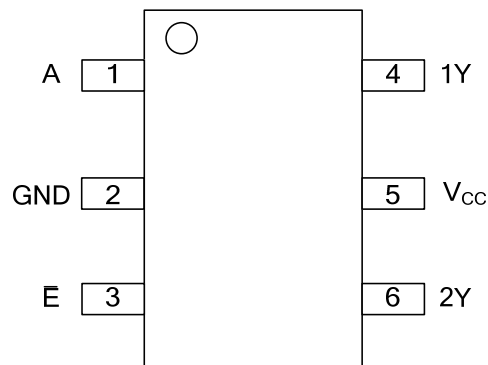
| Ordering Number   |                   | Package | Packing   |
|-------------------|-------------------|---------|-----------|
| Lead Free         | Halogen Free      |         |           |
| U74LVC1G19L-AL6-R | U74LVC1G19G-AL6-R | SOT-363 | Tape Reel |

|                   |                                                    |                                                                        |
|-------------------|----------------------------------------------------|------------------------------------------------------------------------|
| U74LVC1G19L-AL6-R | (1)Packing Type<br>(2)Package Type<br>(3)Lead Free | (1) R: Tape Reel<br>(2) AL6: SOT-363<br>(3) Halogen Free, L: Lead Free |
|-------------------|----------------------------------------------------|------------------------------------------------------------------------|

#### MARKING



## PIN CONFIGURATION



## PIN DESCRIPTION

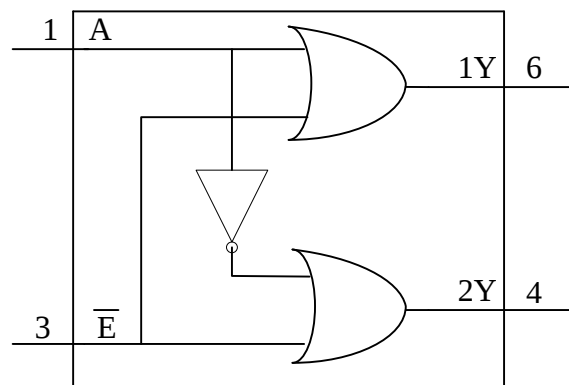
| SYMBOL    | PIN | DESCRIPTION    |
|-----------|-----|----------------|
| A         | 1   | Data input     |
| GND       | 2   | Ground(0V)     |
| $\bar{E}$ | 3   | Enable input   |
| 2Y        | 4   | Data output    |
| Vcc       | 5   | Supply voltage |
| 1Y        | 6   | Data output    |

## FUNCTION TABLE

| INPUT     |   | OUTPUT |    |
|-----------|---|--------|----|
| $\bar{E}$ | A | 1Y     | 2Y |
| L         | L | L      | H  |
| L         | H | H      | L  |
| H         | X | H      | H  |

Note: H: HIGH voltage level; L: LOW voltage level

## LOGIC DIAGRAM (positive logic)



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                                        | Output in the high or low state                 | $V_{OUT}$ | -0.5 ~ $V_{CC}+0.5$ | V    |
|                                                       | Output in the high-impedance or power-off state |           | -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 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    |
| Input Voltage                      | $V_{IN}$            |                                    | 0    |     | 5.5      | V    |
| Output Voltage                     | $V_{OUT}$           | High or low state                  | 0    |     | $V_{CC}$ | V    |
| Operating Temperature              | $T_A$               |                                    | -40  |     | 85       | °C   |
| Input Transition Rise or Fall Rate | $\Delta t/\Delta v$ | $V_{CC}=1.8V\pm0.15V, 2.5V\pm0.2V$ |      |     | 20       | ns/V |
|                                    |                     | $V_{CC}=3.0V\pm0.3V$               |      |     | 10       | ns/V |
|                                    |                     | $V_{CC}=5V\pm0.5V$                 |      |     | 5        | ns/V |

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C, unless otherwise specified)

| PARAMETER                                         | SYMBOL               | TEST CONDITIONS                                                                                         | MIN                  | TYP  | MAX                  | UNIT |
|---------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------|----------------------|------|----------------------|------|
| High-level Input Voltage                          | V <sub>IH</sub>      | V <sub>CC</sub> =1.65V ~ 1.95V                                                                          | 0.65*V <sub>CC</sub> |      |                      | V    |
|                                                   |                      | V <sub>CC</sub> =2.3V ~ 2.7V                                                                            | 1.7                  |      |                      | V    |
|                                                   |                      | V <sub>CC</sub> =2.7V ~ 3.6V                                                                            | 2                    |      |                      | V    |
|                                                   |                      | V <sub>CC</sub> =4.5V ~ 5.5V                                                                            | 0.7*V <sub>CC</sub>  |      |                      | V    |
| Low-level Input Voltage                           | V <sub>IL</sub>      | V <sub>CC</sub> =1.65V ~ 1.95V                                                                          |                      |      | 0.35*V <sub>CC</sub> | V    |
|                                                   |                      | V <sub>CC</sub> =2.3V ~ 2.7V                                                                            |                      |      | 0.7                  | V    |
|                                                   |                      | V <sub>CC</sub> =2.7V ~ 3.6V                                                                            |                      |      | 0.8                  | V    |
|                                                   |                      | V <sub>CC</sub> =4.5V ~ 5.5V                                                                            |                      |      | 0.3*V <sub>CC</sub>  | V    |
| High-Level Output Voltage                         | V <sub>OH</sub>      | I <sub>OH</sub> =-100μA, V <sub>CC</sub> =1.65 ~ 5.5V                                                   | V <sub>CC</sub> -0.1 |      |                      | V    |
|                                                   |                      | I <sub>OH</sub> =-4mA, V <sub>CC</sub> =1.65V                                                           | 1.2                  | 1.54 |                      | V    |
|                                                   |                      | I <sub>OH</sub> =-8mA, V <sub>CC</sub> =2.3V                                                            | 1.9                  | 2.15 |                      | V    |
|                                                   |                      | I <sub>OH</sub> =-16mA, V <sub>CC</sub> =3.0V                                                           | 2.4                  | 2.50 |                      | V    |
|                                                   |                      | I <sub>OH</sub> =-24mA, V <sub>CC</sub> =3.0V                                                           | 2.3                  | 2.62 |                      | V    |
|                                                   |                      | I <sub>OH</sub> =-32mA, V <sub>CC</sub> =4.5V                                                           | 3.8                  | 4.11 |                      | V    |
| Low-Level Output Voltage                          | V <sub>OL</sub>      | I <sub>OL</sub> =100μA, V <sub>CC</sub> =1.65 ~ 5.5V                                                    |                      |      | 0.1                  | V    |
|                                                   |                      | I <sub>OL</sub> =4mA, V <sub>CC</sub> =1.65V                                                            |                      | 0.07 | 0.45                 | V    |
|                                                   |                      | I <sub>OL</sub> =8mA, V <sub>CC</sub> =2.3V                                                             |                      | 0.12 | 0.30                 | V    |
|                                                   |                      | I <sub>OL</sub> =16mA, V <sub>CC</sub> =2.7V                                                            |                      | 0.17 | 0.40                 | V    |
|                                                   |                      | I <sub>OL</sub> =24mA, V <sub>CC</sub> =3.0V                                                            |                      | 0.33 | 0.55                 | V    |
|                                                   |                      | I <sub>OL</sub> =32mA, V <sub>CC</sub> =4.5V                                                            |                      | 0.39 | 0.55                 | V    |
| Input Leakage Current                             | I <sub>I(LEAK)</sub> | V <sub>IN</sub> =5.5V or GND, V <sub>CC</sub> =0 ~ 5.5V                                                 |                      | ±0.1 | ±1                   | μA   |
| Power OFF Leakage Current                         | I <sub>off</sub>     | V <sub>IN</sub> or V <sub>OUT</sub> =5.5V, V <sub>CC</sub> =0V                                          |                      | ±0.1 | ±10                  | μA   |
| Quiescent Supply Current                          | I <sub>CC</sub>      | V <sub>IN</sub> =5.5V or GND, I <sub>OUT</sub> =0<br>V <sub>CC</sub> =1.65 ~ 5.5V                       |                      | 0.1  | 10                   | μA   |
| Additional Quiescent Supply Current Per Input Pin | ΔI <sub>CC</sub>     | V <sub>CC</sub> =2.3 ~ 5.5V, One input at V <sub>CC</sub> -0.6V, Other inputs at V <sub>CC</sub> or GND |                      | 5    | 500                  | μA   |
| Input Capacitance                                 | C <sub>I</sub>       | V <sub>CC</sub> =3.3V, V <sub>IN</sub> =V <sub>CC</sub> or GND                                          |                      | 3.5  |                      | pF   |

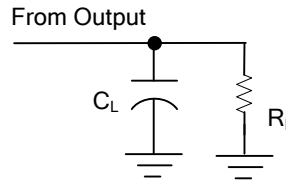
■ SWITCHING CHARACTERISTICS (T<sub>A</sub>=25°C)

| PARAMETER                                                   | SYMBOL                             | TEST CONDITIONS                                                           | MIN | TYP | MAX  | UNIT |
|-------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------|-----|-----|------|------|
| Propagation delay from input (A or $\bar{E}$ ) to output(Y) | t <sub>PLH</sub> /t <sub>PHL</sub> | V <sub>CC</sub> =1.8V±0.15V, C <sub>L</sub> =30 pF<br>R <sub>U</sub> =1KΩ | 3.2 | 4.0 | 16.1 | ns   |
|                                                             |                                    | V <sub>CC</sub> =2.5V±0.2V, C <sub>L</sub> =30pF<br>R <sub>C</sub> =500Ω  | 1.5 | 2.5 | 65   | ns   |
|                                                             |                                    | V <sub>CC</sub> =3.3V±0.3V, C <sub>L</sub> =50 pF<br>R <sub>C</sub> =500Ω | 1.1 | 2.5 | 5.2  | ns   |
|                                                             |                                    | V <sub>CC</sub> =5V±0.5V, C <sub>L</sub> =50pF<br>R <sub>C</sub> =500Ω    | 0.5 | 1.8 | 3.9  | ns   |

■ OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C)

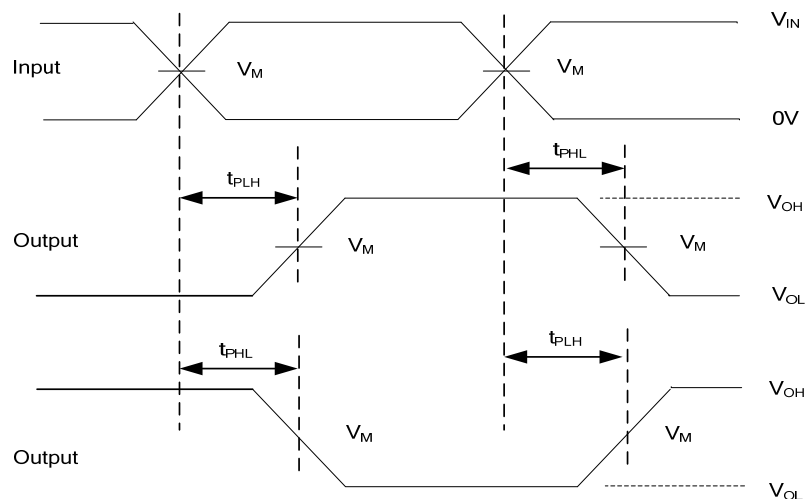
| PARAMETER                     | SYMBOL          | TEST CONDITIONS                                                 | MIN | TYP | MAX | UNIT |
|-------------------------------|-----------------|-----------------------------------------------------------------|-----|-----|-----|------|
| Power Dissipation Capacitance | C <sub>PD</sub> | V <sub>I</sub> = GND to V <sub>CC</sub> , V <sub>CC</sub> =3.3V |     | 16  |     | pF   |

## ■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

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



PROPAGATION DELAY 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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