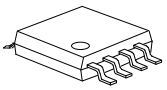
# U74LVC2G158

**Advance** ***CMOS IC***

# SINGLE 2-LINE TO 1-LINE DATA SELECTOR OR MULTIPLEXER



SOP-8

## ■ DESCRIPTION

The **U74LVC2G158** is a single 2-line to 1-line data selector or multiplexer which is featured a common strobe ($\overline{G}$) input. When the strobe is high, the output Y is high and $\overline{Y}$ is low regardless of the levels of other inputs. When the strobe is low, a single bit is selected from one of two sources and is transferred to the output with the true and complementary data.

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

## ■ FEATURES

* Operate from 1.65V to 5.5V
* Inputs accept voltages to 5.5V
* $I_{OFF}$ supports partial-power-down mode
* Low power dissipation
* ±24mA output drive($V_{CC}$=3.3V)

## ■ ORDERING INFORMATION

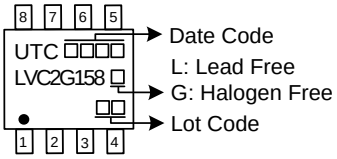
| Ordering Number | | Package | Packing |
|---|---|---|---|
| Lead Free | Halogen Free | | |
| U74LVC2G158L-S08-R | U74LVC2G158G-S08-R | SOP-8 | Tape Reel |

U74LVC2G158G-S08-R

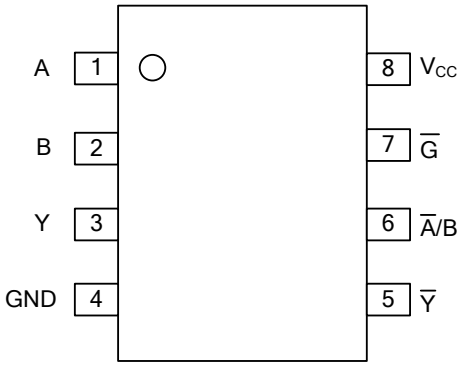
(1) Packing Type
(2) Package Type
(3) Green Package

(1) R: Tape Reel
(2) S08: SOP-8
(3) G: Halogen Free and Lead Free

## ■ MARKING



## ■ PIN CONFIGURATION

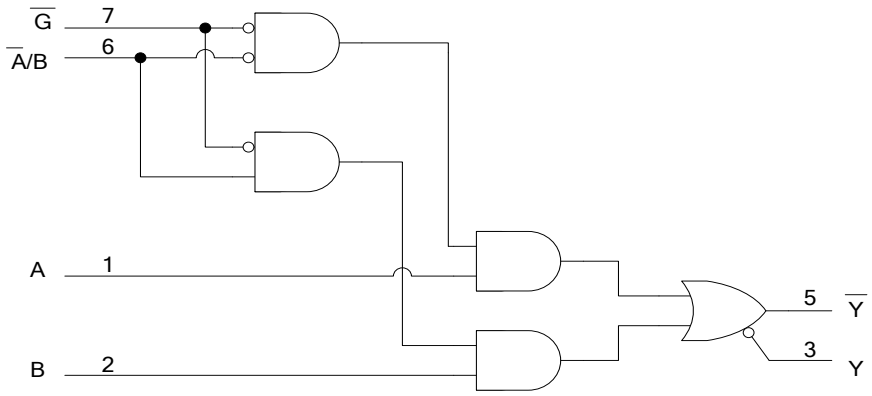



## ■ FUNCTION TABLE (EACH GATE)

| INPUTS | | | | OUTPUT | |
|---|---|---|---|---|---|
| $\overline{G}$ | $\overline{A}$/B | A | B | Y | $\overline{Y}$ |
| H | X | X | X | H | L |
| L | L | L | X | H | L |
| L | L | H | X | L | H |
| L | H | X | L | H | L |
| L | H | X | H | L | H |

Note: H: HIGH voltage level; L: LOW voltage level; X: Don't care

## ■ LOGIC DIAGRAM (positive logic)



## ■ ABSOLUTE MAXIMUM RATING ($T_A$ =25°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 | 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 ($T_A$ =25°C , unless otherwise specified)

| 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 | $V_{OUT}$ | | 0 | | $V_{CC}$ | V |
| High-Level Input Voltage | $V_{IH}$ | $V_{CC}$ =1.65V to 1.95V | 0.65x$V_{CC}$ | | | V |
| | | $V_{CC}$ =2.3V to 2.7V | 1.7 | | | V |
| | | $V_{CC}$ =3.0V to 3.6V | 2 | | | V |
| | | $V_{CC}$ =4.5V to 5.5V | 0.7x$V_{CC}$ | | | V |
| Low-Level Input Voltage | $V_{IL}$ | $V_{CC}$ =1.65V to 1.95V | | | 0.35x$V_{CC}$ | V |
| | | $V_{CC}$ =2.3V to 2.7V | | | 0.7 | V |
| | | $V_{CC}$ =3.0V to 3.6V | | | 0.8 | V |
| | | $V_{CC}$ =4.5V to 5.5V | | | 0.3x$V_{CC}$ | V |
| Input Transition Rise or Fall Rate | Δt/Δv | $V_{CC}$=1.65V to 1.95V,2.3V to 2.7V | | | 20 | ns/V |
| | | $V_{CC}$=3.0V to 3.6V | | | 10 | ns/V |
| | | $V_{CC}$=4.5V to 5.5V | | | 5 | ns/V |
| Operating Temperature | $T_A$ | | -40 | | +125 | °C |

## ■ ELECTRICAL CHARACTERISTICS ($T_A$ =25°C , unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| High-Level Output Voltage | $V_{OH}$ | $V_{CC}$ =1.65V ~ 5.5V, $I_{OH}$=-100μA | $V_{CC}$-0.1 | | | V |
| | | $V_{CC}$ =1.65V, $I_{OH}$=-4mA | 1.2 | | | |
| | | $V_{CC}$ =2.3V, $I_{OH}$=-8mA | 1.9 | | | |
| | | $V_{CC}$ =3.0V, $I_{OH}$=-16mA | 2.2 | | | |
| | | $V_{CC}$ =3.0V, $I_{OH}$=-24mA | 2.3 | | | |
| | | $V_{CC}$ =4.5V, $I_{OH}$=-32mA | 3.8 | | | |
| Low-Level Output Voltage | $V_{OL}$ | $V_{CC}$ =1.65V ~ 5.5V, $I_{OL}$=100μA | | | 0.1 | V |
| | | $V_{CC}$ =1.65V, $I_{OL}$=4mA | | | 0.45 | |
| | | $V_{CC}$ =2.3V, $I_{OL}$=8mA | | | 0.3 | |
| | | $V_{CC}$ =3.0V, $I_{OL}$=16mA | | | 0.4 | |
| | | $V_{CC}$ =3.0V, $I_{OL}$=24mA | | | 0.55 | |
| | | $V_{CC}$ =4.5V, $I_{OL}$=32mA | | | 0.55 | |
| Input Leakage Current | $I_{I(LEAK)}$ | $V_{CC}$ =0V ~ 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 | $I_Q$ | $V_{CC}$ =1.65V ~ 5.5V, $V_{IN}$=5.5V or GND $I_{OUT}$=0 | | | 10 | μA |
| Additional Quiescent Supply Current | $\Delta I_Q$ | $V_{CC}$ =3V ~ 5.5V, One input at $V_{CC}$-0.6V, other inputs at $V_{CC}$ or GND | | | 500 | μA |
| Input Capacitance | $C_{IN}$ | $V_{CC}$ =3.3V, $V_{IN}$=$V_{CC}$ or GND | | 5 | | pF |

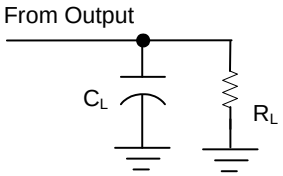
## ■ SWITCHING CHARACTERISTICS ($T_A$ =25°C , unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Propagation delay from input (A or B) to output (Y or $\overline{Y}$) | $t_{PLH}/t_{PHL}$ | $V_{CC}$ =1.65V to 1.95V | 4.4 | | 14 | ns |
| | | $V_{CC}$ =2.3V to 2.7V | 2.1 | | 8 | |
| | | $V_{CC}$ =3.0V to 3.6V | 2 | | 6 | |
| | | $V_{CC}$ =4.5V to 5.5V | 1.4 | | 4 | |
| Propagation delay from input ($\overline{A}$/B) to output (Y or $\overline{Y}$) | $t_{PLH}/t_{PHL}$ | $V_{CC}$ =1.65V to 1.95V | 4.9 | | 16 | ns |
| | | $V_{CC}$ =2.3V to 2.7V | 2.5 | | 9 | |
| | | $V_{CC}$ =3.0V to 3.6V | 2.1 | | 6 | |
| | | $V_{CC}$ =4.5V to 5.5V | 1.6 | | 4 | |
| Propagation delay from input ($\overline{G}$) to output (Y or $\overline{Y}$) | $t_{PLH}/t_{PHL}$ | $V_{CC}$ =1.65V to 1.95V | 4.2 | | 14 | ns |
| | | $V_{CC}$ =2.3V to 2.7V | 2 | | 8 | |
| | | $V_{CC}$ =3.0V to 3.6V | 1.6 | | 6 | |
| | | $V_{CC}$ =4.5V to 5.5V | 1.3 | | 4 | |

## ■ OPERATING CHARACTERISTICS ($T_A$ =25°C , unless otherwise specified)

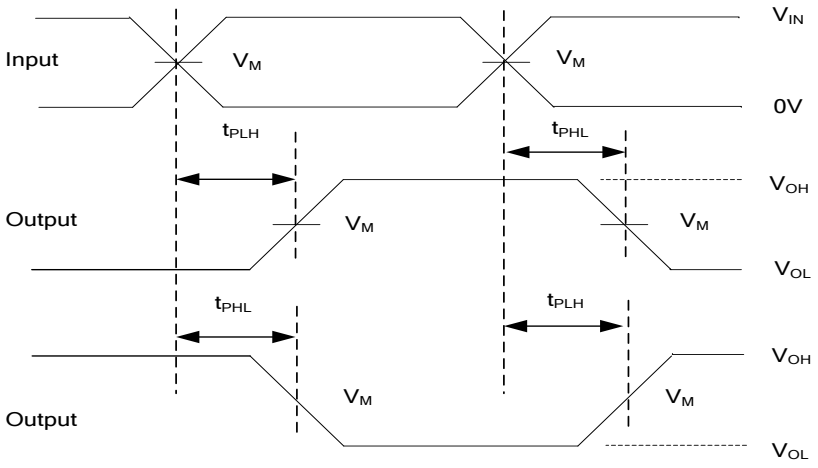
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Power Dissipation Capacitance | $C_{PD}$ | $V_{CC}$=1.8V, f=10MHz | | 35 | | pF |
| | | $V_{CC}$=2.5V, f=10MHz | | 35 | | pF |
| | | $V_{CC}$=3.3V, f=10MHz | | 37 | | pF |
| | | $V_{CC}$=5V, f=10MHz | | 40 | | pF |

## ■ TEST CIRCUIT AND WAVEFORMS (Cont.)




**TEST CIRCUIT**

| $V_{CC}$ | Inputs | | $V_M$ | $C_L$ | $R_L$ |
|---|---|---|---|---|---|
| | $V_{IN}$ | $t_R$, $t_F$ | | | |
| $V_{CC}$ =1.65V to 1.95V | $V_{CC}$ | ≤2ns | $V_{CC}/2$ | 30pF | 1KΩ |
| $V_{CC}$ =2.3V to 2.7V | $V_{CC}$ | ≤2ns | $V_{CC}/2$ | 30pF | 500Ω |
| $V_{CC}$ =3.0V to 3.6V | 3.0V | ≤2.5ns | 1.5V | 50pF | 500Ω |
| $V_{CC}$ =4.5V to 5.5V | $V_{CC}$ | ≤2.5ns | $V_{CC}/2$ | 50pF | 500Ω |




**PROPAGATION DELAY TIMES**

Notes: 1. $C_L$ includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, $Z_O$ = 50Ω.