



## U74LVC2G86

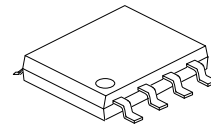
CMOS IC

### DUAL 2-INPUT EXCLUSIVE-OR GATE

#### DESCRIPTION

The **U74LVC2G86** is a dual 2-input exclusive-OR gate which provides the function  $Y=A \oplus B$  or  $Y=\overline{AB}+\overline{A\overline{B}}$ .

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



SOP-8

#### FEATURES

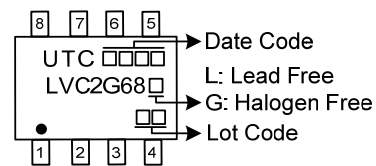
- \* Operate from 1.65V to 5.5V
- \* Inputs accept voltages to 5.5V
- \*  $I_{off}$  supports partial-power-down mode
- \* Low power dissipation,  $I_{CC}=10\mu A$  (Max)
- \* Max  $t_{PD}$  of 4.7 ns at 3.3V
- \*  $\pm 24mA$  output drive( $V_{CC}=3.3V$ )

#### ORDERING INFORMATION

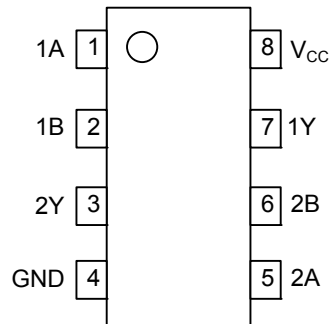
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC2G86L-S08-R	U74LVC2G86G-S08-R	SOP-8	Tape Reel

<p>U74LVC2G86G-S08-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION

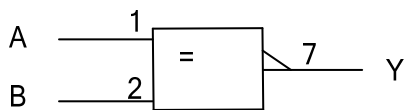
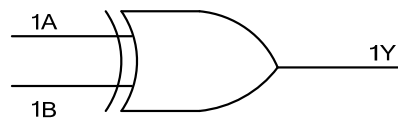
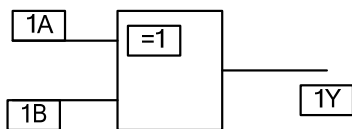


■ FUNCTION TABLE

INPUT		OUTPUT
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

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
		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
Operating Temperature	$T_A$		-40		85	°C
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

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-level Input Voltage	$V_{IH}$	$V_{CC}=1.65V \sim 1.95V$	$0.65 \cdot V_{CC}$			V
		$V_{CC}=2.3V \sim 2.7V$	1.7			V
		$V_{CC}=3V \sim 3.6V$	2			V
		$V_{CC}=4.5V \sim 5.5V$	$0.7 \cdot V_{CC}$			V
Low-level Input Voltage	$V_{IL}$	$V_{CC}=1.65V \sim 1.95V$			$0.35 \cdot V_{CC}$	V
		$V_{CC}=2.3V \sim 2.7V$			0.7	V
		$V_{CC}=3V \sim 3.6V$			0.8	V
		$V_{CC}=4.5V \sim 5.5V$			$0.3 \cdot V_{CC}$	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
		$V_{CC}=3.0V, I_{OH}=-24mA$	2.3			V
		$V_{CC}=4.5V, I_{OH}=-32mA$	3.8			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
		$V_{CC}=3.0V, I_{OL}=24mA$			0.55	V
		$V_{CC}=4.5V, I_{OL}=32mA$			0.55	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{IN}=5.5V$ or GND, $V_{CC}=0 \sim 5.5V$			±5	μA
Power OFF Leakage Current	$I_{off}$	$V_{IN}$ or $V_{OUT}=5.5V, V_{CC}=0V$			±10	μA

### ■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Supply Current	$I_{CC}$	$V_{IN}=5.5V$ or GND, $I_{OUT}=0$ $V_{CC}=1.65 \sim 5.5V$			10	$\mu A$
Additional Quiescent Supply Current Per Input Pin	$\Delta I_{CC}$	$V_{CC}=3 \sim 5.5V$ , One input at $V_{CC}-0.6V$ , Other inputs at $V_{CC}$ or GND			500	$\mu A$
Input Capacitance	$C_I$	$V_{CC}=3.3V$ , $V_{IN}=V_{CC}$ or GND		5		pF

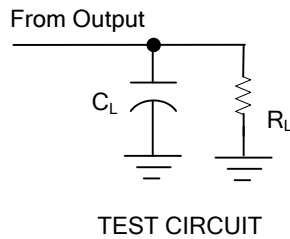
### ■ SWITCHING CHARACTERISTICS ( $T_A = 25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	$t_{PLH}/t_{PHL}$	$V_{CC}=1.8V \pm 0.15V$ , $C_L=30pF$	4.1		9.9	ns
		$V_{CC}=2.5V \pm 0.2V$ , $C_L=30pF$	2		5.7	ns
		$V_{CC}=3.3V \pm 0.3V$ , $C_L=50pF$	1.6		4.7	ns
		$V_{CC}=5V \pm 0.5V$ , $C_L=50pF$	1.4		3.6	ns

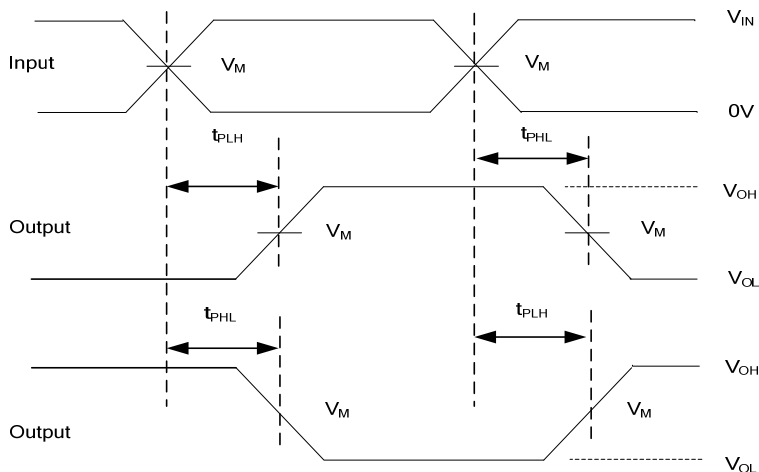
### ■ OPERATING CHARACTERISTICS ( $T_A = 25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	$V_{CC}=3.3V$ , $f=10MHz$		21		pF

■ TEST CIRCUIT AND WAVEFORMS(Cont.)



$V_{CC}$	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 $\Omega$
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	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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