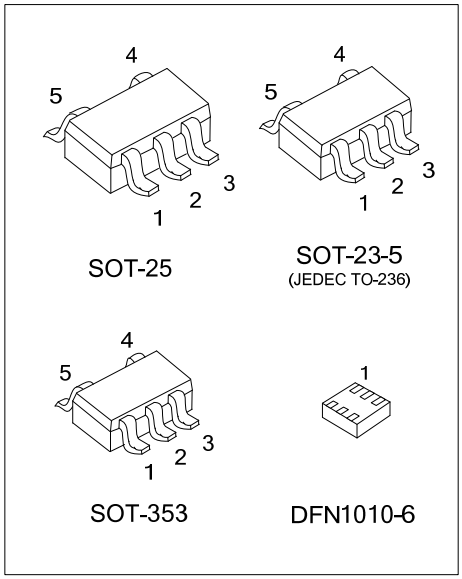
U74LVC1G02

CMOS IC

SINGLE 2-INPUT NOR GATE



■ DESCRIPTION

The **U74LVC1G02** is a 2-input NOR gate device which provides the Function $Y=\overline{A+B}$ in positive logic.

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

■ FEATURES

* Operation Voltage Range: 1.6V ~ 5.5V
* Low Power Current: I_{CC}=10μA (Max.)
* ±24mA Output Drive (V_{CC}=3.0V)
* Power Down Protection

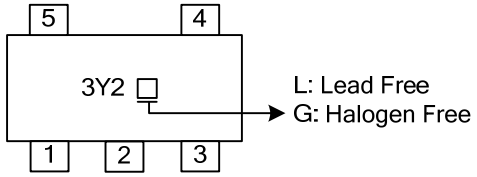
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G02L-AE5-R	U74LVC1G02G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G02L-AF5-R	U74LVC1G02G-AF5-R	SOT-25	Tape Reel
U74LVC1G02L-AL5-R	U74LVC1G02G-AL5-R	SOT-353	Tape Reel
U74LVC1G02L-K06-1010-R	U74LVC1G02G-K06-1010-R	DFN1010-6	Tape Reel

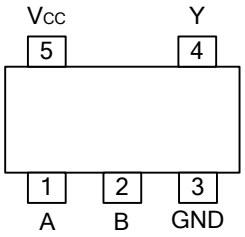
U74LVC1G02G-AE5-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353
K06-1010: DFN1010-6
(3) G: Halogen Free and Lead Free, L: Lead Free

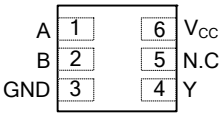
■ MARKING

SOT-23-5 / SOT-25 / SOT-353	DFN1010-6
	

■ PIN CONFIGURATION



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



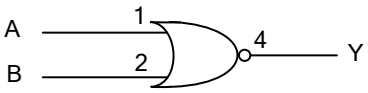
DFN-6(1.0×1.0)
(TOP VIEW)

■ FUNCTION TABLE

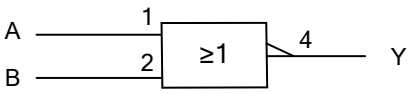
INPUT(A)	INPUT(B)	OUTPUT(Y)
H	H	L
H	L	L
L	H	L
L	L	H

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

■ LOGIC DIAGRAM (positive logic)



Logic Symbol



IEC Logic Symbol

■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +6.5	V
Input Voltage	V_{IN}		-0.5 ~ +6.5	V
Output Voltage	V_{OUT}	Output in the high or low state	-0.5 ~ V_{CC} +0.5	V
		Output in the power-off state	-0.5 ~ +6.5	V
Continuous V_{CC} or GND Current	I_{CC}		±100	mA
Continuous Output Current	I_{OUT}	V_{OUT}=0 to V_{CC}	±50	mA
Input Clamp Current	I_{IK}	V_{IN}<0	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}<0	-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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-5	θ_{JA}	280	°C/W
	SOT-25		230	°C/W
	SOT-353		350	°C/W
	DFN1010-6		250	°C/W

■ 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
Input Transition Rise or Fall Rate	Δt/Δv	V_{CC}=1.8V±0.15V,2.5V±0.2V			20	ns/V
		V_{CC}=3.3V±0.3V			10	ns/V
		V_{CC}=5V±0.5V			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 Input Voltage	V_{IH}	V_{CC}=1.65V ~ 1.95V		0.65xV_{CC}			V
		V_{CC}=2.3V ~ 2.7V		1.7			V
		V_{CC}=3V ~ 3.6V		2			V
		V_{CC}=4.5V ~ 5.5V		0.7xV_{CC}			V
Low-Level Input Voltage	V_{IL}	V_{CC}=1.65V ~ 1.95V				0.35xV_{CC}	V
		V_{CC}=2.3V ~ 2.7V				0.7	V
		V_{CC}=3V ~ 3.6V				0.8	V
		V_{CC}=4.5V ~ 5.5V				0.3xV_{CC}	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65 ~ 5.5V, I_{OH}=-100μA		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
			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 ~ 5.5V, I_{OL}=100μA				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
			I_{OL}=24mA			0.55	V
		V_{CC}=4.5V, I_{OL}=32mA				0.55	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 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}=1.65 ~ 5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0A				10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_Q	V_{CC}=3 ~ 5.5V, One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND				500	μA
Input Capacitance	C_I	V_{CC}=3.3V, V_{IN}=V_{CC} or GND			4		pF

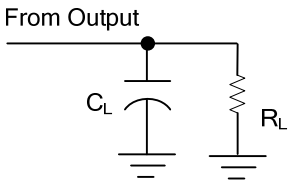
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t_{PLH} / t_{PHL}	C_L=15pF, R_L=1MΩ	V_{CC}=1.8±0.15V	1.9		7.2	ns
			V_{CC}=2.5±0.2V	0.8		4.4	ns
			V_{CC}=3.3±0.3V	0.8		3.6	ns
			V_{CC}=5±0.5V	0.8		3.4	ns
	t_{PLH} / t_{PHL}	C_L=30pF	V_{CC}=1.8±0.15V, R_L=1KΩ	2.8		8	ns
			V_{CC}=2.5±0.2V, R_L=500Ω	1.2		5.5	ns
		C_L=50pF, R_L=500Ω	V_{CC}=3.3±0.3V	1		4.5	ns
			V_{CC}=5±0.5v	1		4	ns

■ OPERATING CHARACTERISTICS (f=10MHz, T_A =25°C , unless otherwise specified)

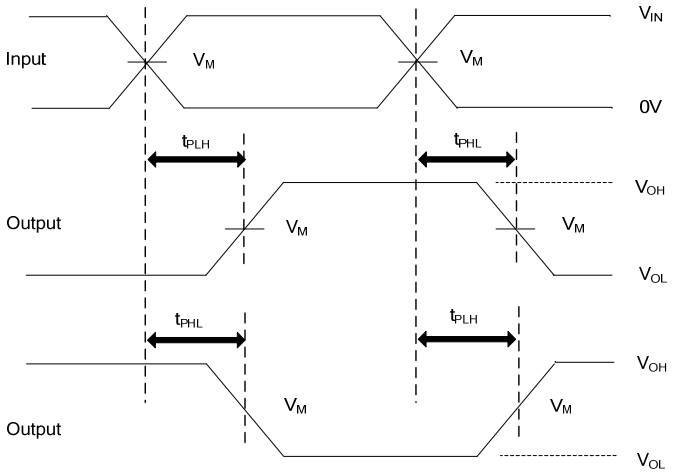
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V		23		pF
		V_{CC}=2.5V		23		pF
		V_{CC}=3.3V		23		pF
		V_{CC}=5.0V		25		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	Inputs		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	15pF	1MΩ
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



PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.
All input pulses are supplied by generators having the following characteristics: P_{RR} ≤10MHz, Z_O = 50Ω.