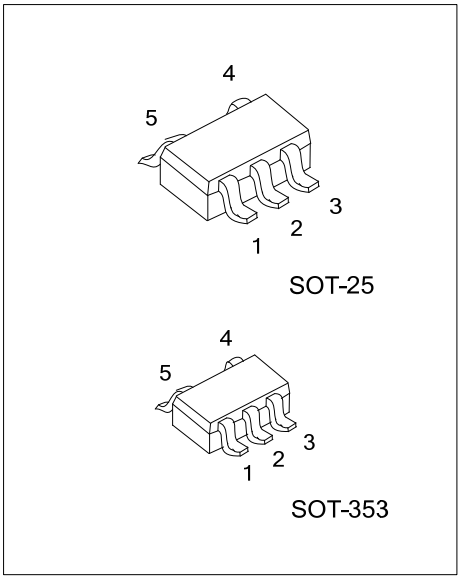
U74LVC1GU04

CMOS IC

SINGLE POWER SUPPLY
SINGLE INVERTER GATE



■ DESCRIPTION

This single inverter gate is designed for 1.65V to 5.5V V_{CC} operation.

The **U74LVC1GU04** device contains one inverter with an unbuffered output and performs the Boolean function $Y = \overline{A}$.

■ FEATURES

* Operation Voltage Range: 1.65V ~ 5.5V
* Low Power Current: I_{CC}=10μA (Max.)
* ±24mA Output Drive (V_{CC}=3.3V)
* Power Down Protection
* Unbuffered Output

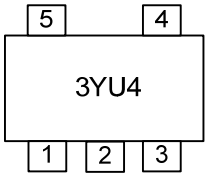
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1GU04L-AF5-R	U74LVC1GU04G-AF5-R	SOT-25	Tape Reel
U74LVC1GU04L-AL5-R	U74LVC1GU04G-AL5-R	SOT-353	Tape Reel

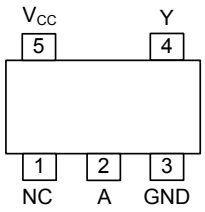
U74LVC1GU04G-AF5-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AF5: SOT-25, AL5: SOT-353
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



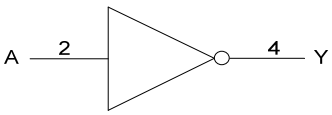
■ PIN CONFIGURATION



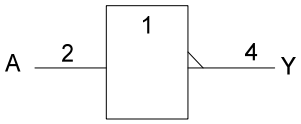
■ FUNCTION TABLE (each gate)

INPUT	OUTPUT
A	Y
H	L
L	H

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified) (Note 2)

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ 6.5	V
Input Voltage (Note 2)	V_{IN}		-0.5 ~ 6.5	V
Output Voltage (Note 2)	V_{OUT}	Output in the high or low state	-0.5 ~ V_{CC}+0.5	V
Continuous Output Current	I_{OUT}		±50	mA
Continuous current through		V_{CC} or GND	±100	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

Notes: 1. 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.
2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ 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}		0		V_{CC}	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	V_{CC}=1.6V ~ 2.7V			20	ns/V
		V_{CC}=2.7V ~ 5.5V			10	ns/V
Operating Temperature	T_A		-40		+125	°C

■ STATIC 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~5.5V, I_{OH}=-100μA		0.75×V_{CC}			V
Low-Level Input Voltage	V_{IL}	V_{CC} =1.65V~5.5V, I_{OL}=-100μA				0.25×V_{CC}	V
High-Level Output Voltage	V_{OH}	V_{IL}=0V, V_{CC} =1.65V ~ 5.5V, I_{OL}=-100μA		V_{CC}-0.1			V
		V_{IL}=0V, V_{CC} =1.65V, I_{OH}=-4mA		1.2			V
		V_{IL}=0V, V_{CC} =2.3V, I_{OH}=-8mA		1.9			V
		V_{IL}=0V, V_{CC} =3V	I_{OH}=-16mA	2.4			V
			I_{OH}=-24mA	2.3			V
		V_{IL}=0V, V_{CC} =4.5V, I_{OH}=-32mA		3.8			V
Low-Level Output Voltage	V_{OL}	V_{IH}=V_{CC}, V_{CC} =1.65V ~ 5.5V, I_{OL}=100μA				0.1	V
		V_{IH}=V_{CC}, V_{CC} =1.65V, I_{OL}=4mA				0.45	V
		V_{IH}=V_{CC}, V_{CC} =2.3V, I_{OL}=8mA				0.3	V
		V_{IH}=V_{CC}, V_{CC} =3V	I_{OL}=16mA			0.4	V
			I_{OL}=24mA			0.55	V
		V_{IH}=V_{CC}, V_{CC} =4.5V, I_{OL}=32mA				0.55	V
A Input Leakage Current	$I_{I(LEAK)}$	V_{CC} =0V ~ 5.5V, V_{IN}=5.5V or GND				±5	μA
Quiescent Supply Current	I_Q	V_{CC} =1.65V~5.5V, V_{IN}=5.5V or GND, I_O=0				10	μA
Input Capacitance	C_{IN}	V_{CC} =3.3V, V_{IN}=V_{CC} or GND (T_A=-40~+85°C)			7		pF

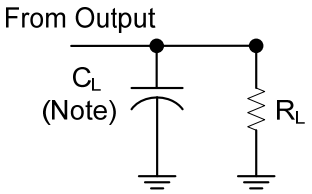
■ DYNAMIC CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A) to output(Y)	t_{PLH}/t_{PHL}	V_{CC}=1.8V±0.15V	1.3		5.5	ns
		V_{CC}=2.5V±0.2V	1.0		4.5	ns
		V_{CC}=3.3V±0.3V	1.1		4.2	ns
		V_{CC}=5V±0.5V	1.0		3.5	ns

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

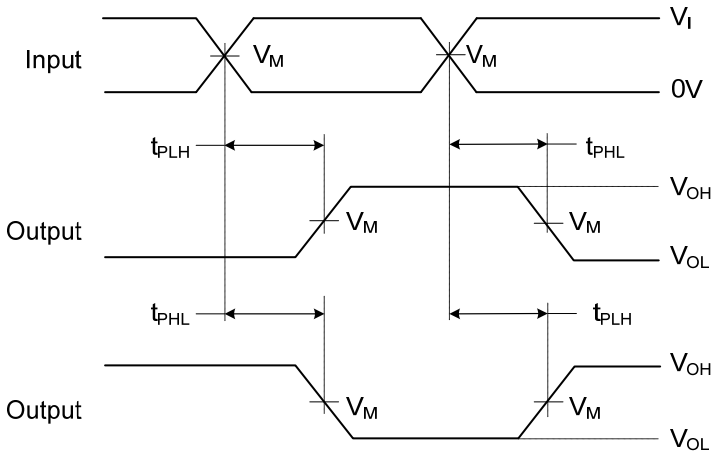
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V±0.15V		9		pF
		V_{CC}=2.5V±0.2V		11		pF
		V_{CC}=3.3V±0.3V		13		pF
		V_{CC}=5V±0.5V		27		pF

■ TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

V_{CC}	INPUTS		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	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



VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES INVERTING AND NONINVERTING OUTPUTS

Notes: 1. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1MHz, Z_O=50Ω, t_r ≤ 3ns.
2.The outputs are measured one at a time, with one transition per measurement.