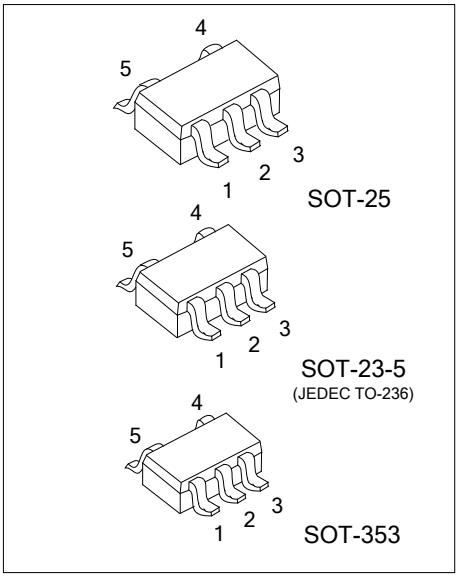
U74LVC1G04

CMOS IC

SINGLE INVERTER GATE



■ DESCRIPTION

The UTC **U74LVC1G04** is a single inverter gate, it provides the function $Y = \overline{A}$.

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

■ FEATURES

* Operation voltage range: 1.65~5.5V
* Low power current: I_{CC}=10μA(Max)
* ±24mA output drive (V_{CC}=3.3V)
* High noise immunity
* Power down protection

■ ORDERING INFORMATION

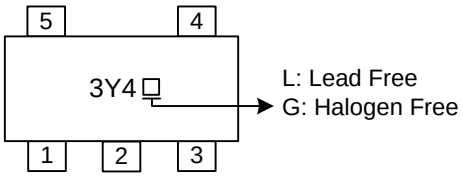
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G04L-AE5-R	U74LVC1G04G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G04L-AF5-R	U74LVC1G04G-AF5-R	SOT-25	Tape Reel
U74LVC1G04L-AL5-R	U74LVC1G04G-AL5-R	SOT-353	Tape Reel

U74LVC1G04G-AE5-R

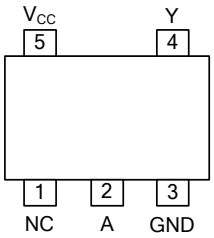
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353
(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)

■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)(Note 2)

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	-0.5 ~ 6.5	V
Input Voltage		V_{IN}	-0.5 ~ 6.5	V
Output Voltage(Active Mode)		V_{OUT}	-0.5 ~ V_{CC}+0.5	V
Output Voltage(Power-Down Mode)		V_{OUT}	-0.5 ~ 6.5	V
Input Clamp Current(V_{IN}<0)		I_{IK}	-50	mA
Output Clamp Current(V_{OUT}<0)		I_{OK}	-50	mA
Output Current		I_{OUT}	±50	mA
V_{CC} or GND Current		I_{CC}	±100	mA
Power Dissipation (T_A=-40~+125°C)	SOT-23-5	P_D	300	mW
	SOT-25		360	mW
	SOT-353		250	mW
Junction Temperature		T_J	+150	°C
Storage Temperature		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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	SOT-23-5	θ_{JC}	75	°C/W
	SOT-25		55	°C/W
	SOT-353		145	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		5.5	V
		Data retention only	1.5			
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Rate	t_R, t_F	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

■ STATIC CHARACTERISTICS (T_A=-40~+125°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage High-Level	V_{IH}	V_{CC}= 1.65V~1.95V	0.65×V_{CC}			V
		V_{CC}= 2.3V~2.7V	1.7			
		V_{CC}= 2.7V~3.6V	2			
		V_{CC}= 4.5V~5.5V	0.7×V_{CC}			
Input Voltage Low-Level	V_{IL}	V_{CC}= 1.65V~1.95V			0.35×V_{CC}	V
		V_{CC}= 2.3V~2.7V			0.7	
		V_{CC}= 2.7V~3.6V			0.8	
		V_{CC}= 4.5V~5.5V			0.3×V_{CC}	
Output Voltage High-Level	V_{OH}	V_{CC}= 1.65V~5.5V, I_{OH}=-100μA	V_{CC}-0.1			V
		V_{CC}= 1.65V, I_{OH}=-4mA	0.95			
		V_{CC}= 2.3V, I_{OH}=-8mA	1.7			
		V_{CC}= 3V, I_{OH}=-16mA	1.9			
		V_{CC}= 3V, I_{OH}=-24mA	2.0			
		V_{CC}= 4.5V, I_{OH}=-32mA	3.4			
Output Voltage Low-Level	V_{OL}	V_{CC}= 1.65V~5.5V, I_{OL}=100μA			0.1	V
		V_{CC}= 1.65V, I_{OL}=4mA			0.7	
		V_{CC}= 2.3V, I_{OL}=8mA			0.45	
		V_{CC}= 3V, I_{OL}=16mA			0.6	
		V_{CC}= 3V, I_{OL}=24mA			0.8	
		V_{CC}= 4.5V, I_{OL}=32mA			0.8	
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}= 0~5.5V, V_{IN}=5.5V or GND		±0.1	±5	μA

■ STATIC CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power OFF Leakage Current	I_{OFF}	V_{CC}= 0V, V_{IN} or V_{OUT} =5.5V		±0.1	±10	μA
Quiescent Supply Current	I_Q	V_{CC}= 1.65V~5.5V, V_{IN}=5.5 or GND, I_{OUT}=0		0.1	10	μA
Additional Quiescent Supply Current	ΔI_Q	V_{CC}= 3V~5.5V, One input at V_{CC}-0.6V, other inputs at V_{CC} or GND		5	500	μA
Input Capacitance	C_{IN}	V_{CC}= 3.3V, V_{IN}=V_{CC} or GND		3.5		pF

Note: All typical values are measured at V_{CC}=3.3V and T_A=25°C.

■ DYNAMIC CHARACTERISTICS (T_A=-40~+125°C, unless otherwise specified)

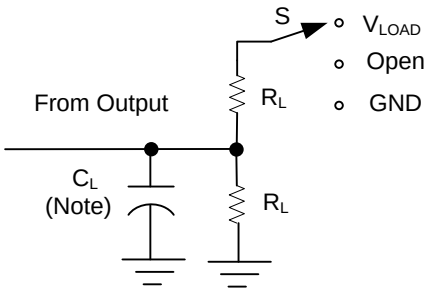
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A or B) to Output (Y)	t_{PLH}/t_{PHL}	V_{CC}= 1.8V±0.15V, C_L=15 pF	1.0		6.4	ns
		V_{CC}= 2.5V±0.2V, C_L=15 pF	0.5		4.2	ns
		V_{CC}= 3.3V±0.3V, C_L=15 pF	0.5		3.3	ns
		V_{CC}= 5V±0.5V, C_L=15 pF	0.5		3.1	ns
		V_{CC}= 1.8V±0.15V, C_L=30pF	1.0		9.5	ns
		V_{CC}= 2.5V±0.2V, C_L=30pF	0.5		6.5	ns
		V_{CC}= 3.3V±0.3V, C_L=50 pF	0.5		5.5	ns
		V_{CC}= 5V±0.5V, C_L=50 pF	0.5		5.0	ns

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V, f=10MHz		16		pF
		V_{CC}=2.5V, f=10MHz		18		pF
		V_{CC}=3.3V, f=10MHz		18		pF
		V_{CC}=5V, f=10MHz		20		pF

Note: All typical values are measured at T_A=25°C.

■ TEST CIRCUIT AND WAVEFORMS



TEST	S
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Note: C_L includes probe and jig capacitance.

V_{CC}	V_{IN}	t_R, t_F	V_M	V_{LOAD}	C_L	R_L	$V_\triangle$
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	15pF	1MΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	15pF	1MΩ	0.15V
3.3V±0.3V	3 V	≤2.5ns	1.5V	6V	15pF	1MΩ	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	$2\times V_{CC}$	15pF	1MΩ	0.3V
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	30pF	1kΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	30pF	500Ω	0.15V
3.3V±0.3V	3 V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	$2\times V_{CC}$	50pF	500Ω	0.3V