SN74LVC2G02DCTR-TP
DUAL 2-INPUT POSITIVE-NORGATE

DESCRIPTION

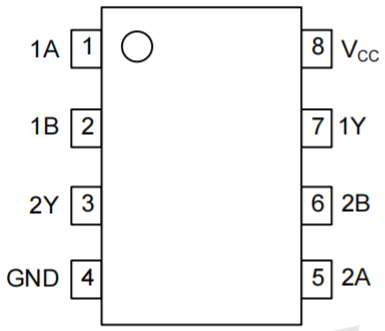
The UTC **74LVC2G02**DP-**T**P is a dual 2-input positive -NOR gate which provides the function $Y=\overline{A+B}$ or $Y=\overline{A}+\overline{B}$.

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

FEATURES

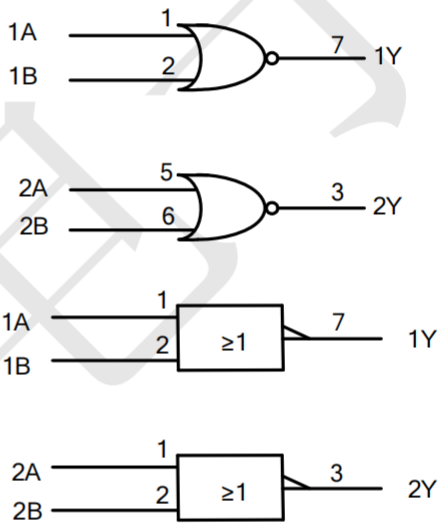
* Operation Voltage Range: 1.65V ~ 5.5V
* Low Power Dissipation: I_{CC}=10μA (Max.)
* High Speed: t_{PD}=4.9ns (V_{CC}=3.3V)
* I_{OFF} supports partial-power-down mode operation

PIN CONFIGURATION



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LOGIC DIAGRAM (positive logic)



IEC logic symbol

FUNCTION TABLE (each gate)

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

ABSOLUTE MAXIMUM RATINGS (T A = 25°C , unless otherwise specified) (Note)

PARAMETER	SYMBOL	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}		-0.5 ~ V_{CC}+0.5	V
Input Clamp Current	I_{IK}	$V_{IN}<0$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT}<0$	-50	mA
Output Current	I_{OUT}		±50	mA
V_{CC} or GND Current	I_{CC}		±100	mA
Storage Temperature	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	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		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	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

STATIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	V_{CC}=1.65V~1.95V	0.65×V_{CC}			V
		V_{CC}=2.3V~2.7V	1.7			V
		V_{CC}=3V~3.6V	2			V
		V_{CC}=4.5V~5.5V	0.7×V_{CC}			V
Low-Level Input Voltage	V_{IL}	V_{CC}=1.65V~1.95V			0.35×V_{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			0.3×V_{CC}	V
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
		V_{CC}=2.3V, I_{OH}=-8mA	1.9			V
		V_{CC}=3V, I_{OH}=-16mA	2.4			V
		V_{CC}=3V, I_{OH}=-24mA	2.3			V
		V_{CC}=4.5V, I_{OH}=-32mA	3.8			V
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65V~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}=3V, I_{OL}=16mA			0.4	V
		V_{CC}=3V, 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 to 5.5V, V_{IN}=5.5V or GND			±5	μA
Power Off Current	I_{off}	V_{CC}=0V, V_{IN} or V_{OUT}=5.5V			±10	μA

STATIC CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Supply Current	I_{CC}	V_{CC}=1.65V~5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	V_{CC}=3V~5.5V, One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND			500	uA
Input Capacitance	C_{IN}	V_{CC}=3.3V, V_{IN}=V_{CC} or GND		5		pF

DYNAMIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A or B) to Output (Y)	t_{PHL} /t_{PLH}	V_{CC} =1.8V±0.15V, C_L=30 pF, R_L=1KΩ			8.9	ns
		V_{CC}=2.5V±0.2V, C_L=30 pF, R_L=500Ω			5.4	ns
		V_{CC}=3.3V±0.3V, C_L=50 pF, R_L=500Ω			4.9	ns
		V_{CC}=5V±0.5V, C_L=50 pF, R_L=500Ω			4.4	ns

Note: See Fig. 1 and Fig. 2 for test circuit and waveforms.

OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=3.3V, f=10MHz		19		pF

TEST CIRCUIT AND WAVEFORMS

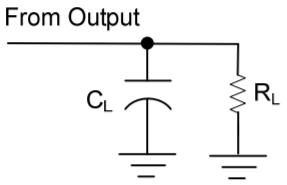


Fig.1 TEST CIRCUIT

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

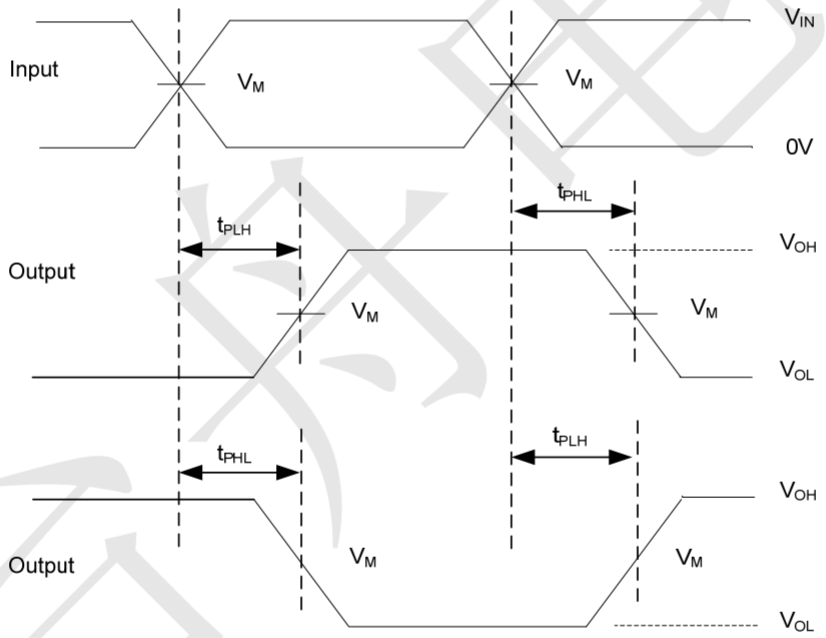
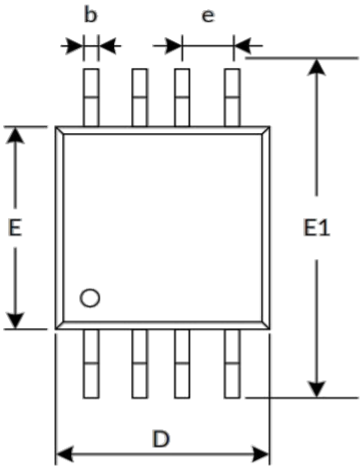


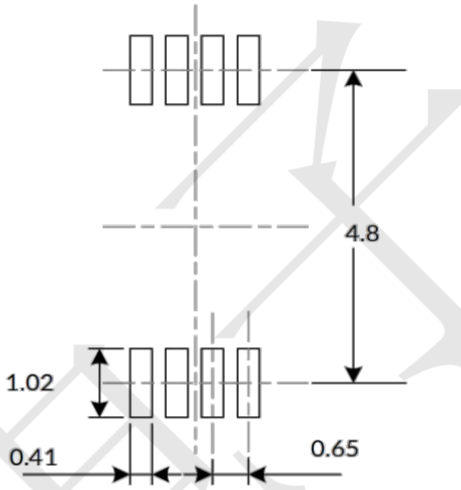
Fig.2 PROPAGATION DELAY TIMES

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

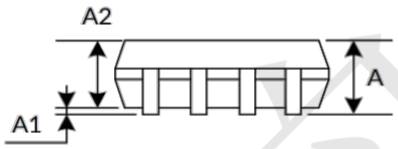
Package information

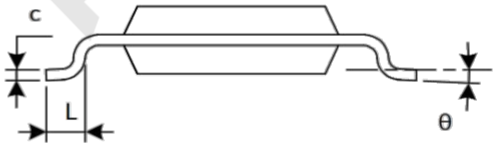
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RECOMMENDED LAND PATTERN (Unit: mm)





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°