74HC2G00DP-TP
2-INPUT NAND GATE

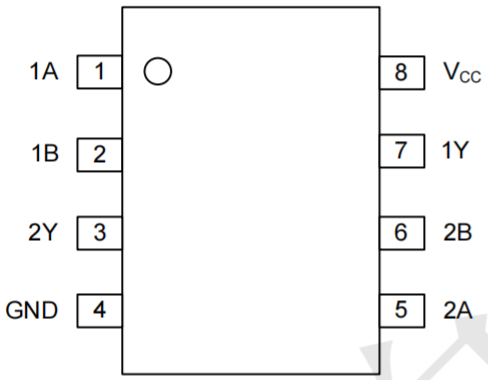
DESCRIPTION

The UTC **74HC2G00DP-TP** is a high-speed CMOS device which provides 2-input NAND gates.

FEATURES

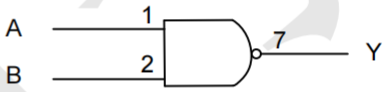
* Operation Voltage Range: 2.0~6.0V
* Low Power Dissipation: I_{CC}=10μA (Max.)
* High Speed: tpd=9ns (V_{CC}=4.5V, C_L=50pF)

PIN CONFIGURATION

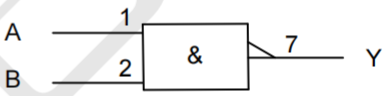


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LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

FUNCTION TABLE (each gate)

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

ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ +7.0	V
Input Voltage	V_{IN}	-0.5 ~ +7.0	V
Output Voltage	V_{OUT}	-0.5 ~ V_{CC}+0.5	V
Input Clamp Current	I_{IK}	±20	mA
Output Clamp Current	I_{OK}	±20	mA
Output Current	I_{OUT}	25	mA
V_{CC} or GND Current	I_{CC}	±50	mA
Power dissipation	P_D	300	mW
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	MIN	TYP	MAX	UNIT
Supply Voltage		V_{CC}	2.0	5.0	6.0	V
Input Voltage		V_{IN}	0		V_{CC}	V
Output Voltage		V_{OUT}	0		V_{CC}	V
Input Transition Rise or Fall Times	V_{CC}=2.0V	$\Delta t/\Delta v$			625	ns/V
	V_{CC}=4.5V			1.67	139	ns/V
	V_{CC}=6.0V				83	ns/V
Operating Temperature		T_A	-40	+25	+125	°C

ELECTRICAL CHARACTERISTICS

(Voltage are referenced to GND=0V, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	V_{CC}=2.0V	1.5	1.2		V
		V_{CC}=4.5V	3.15	2.4		V
		V_{CC}=6.0V	4.2	3.2		V
Low-Level Input Voltage	V_{IL}	V_{CC}=2.0V		0.8	0.5	V
		V_{CC}=4.5V		2.1	1.35	V
		V_{CC}=6.0V		2.8	1.8	V
High-Level Output Voltage	V_{OH}	V_{CC}=2.0V, I_{OH}=-20μA	1.9	2.0		V
		V_{CC}=4.5V, I_{OH}=-20μA	4.4	4.5		V
		V_{CC}=6.0V, I_{OH}=-20μA	5.9	6.0		V
		V_{CC}=4.5V, I_{OH}=-4mA	4.13	4.32		V
		V_{CC}=6.0V,I_{OH}=-5.2mA	5.63	5.81		V
Low-Level Output Voltage	V_{OL}	V_{CC}=2.0V, I_{OL}=20μA		0	0.1	V
		V_{CC}=4.5V, I_{OL}=20μA		0	0.1	
		V_{CC}=6.0V, I_{OL}=20μA		0	0.1	
		V_{CC}=4.5V, I_{OL}=4mA		0.15	0.33	
		V_{CC}=6.0V, I_{OL}=5.2mA		0.16	0.33	
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=6.0V, V_{IN}=V_{CC} or GND			±1	μA
Quiescent Supply Current	I_Q	V_{CC}=6.0V, V_{IN}=V_{CC} or GND, I_{OUT}=0			10	μA
Input Capacitance	C_{IN}	V_{CC}=5.0V, V_{IN}=V_{CC} or GND		1.5		pF

DYNAMIC CHARACTERISTICS (Input: t_R, $t_F \leq 6ns$; PRR≤1MHz, C_L=50pF)

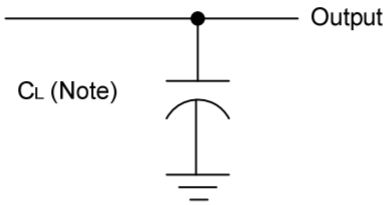
See Fig. 1 and Fig. 2 for test circuit and waveforms.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A and B) to output(Y)	t_{PHL} /t_{PLH}	V_{CC}=2.0V		25	95	ns
		V_{CC}=4.5V		9	19	
		V_{CC}=6.0V		7	16	
Output transition Time	t_{THL} /t_{TLH}	V_{CC}=2.0V		18	95	ns
		V_{CC}=4.5V		6	19	
		V_{CC}=6.0V		5	16	

OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load, f=1MHz, V_{CC}=5V		10		pF

TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

Fig. 1 Load circuitry for switching times.

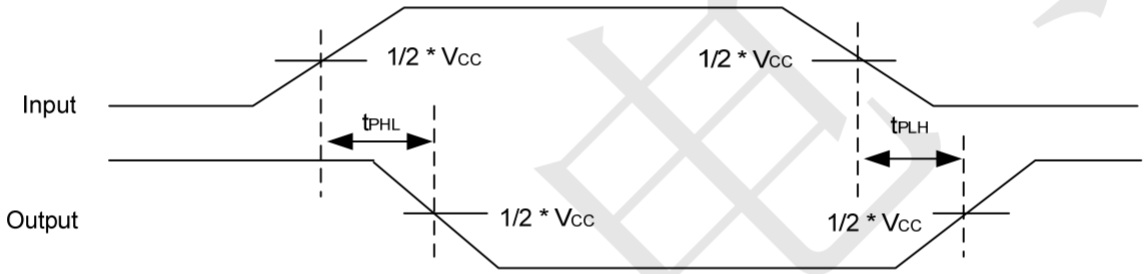
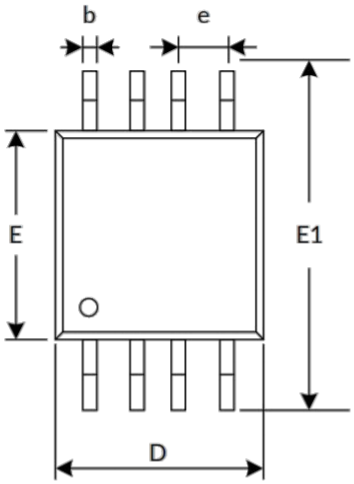
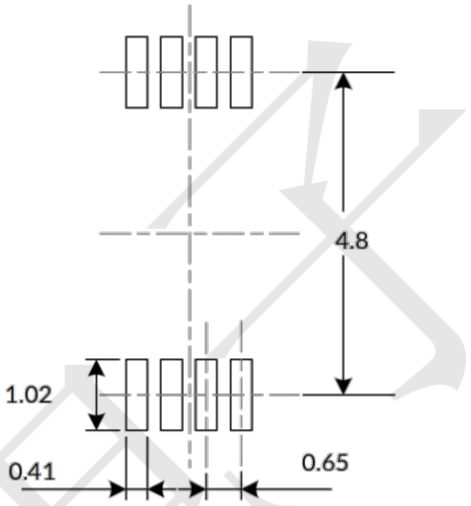


Fig. 2 Propagation delay from input(A and B) to output(Y) and Output transition time.

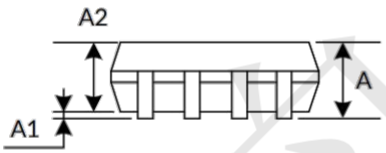
Package information

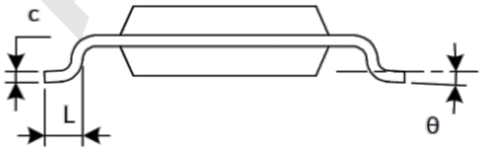
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RECOMMENDED LAND PATTERN (Unit: mm)





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°