74HC2G08DP-TP
2-INPUT AND GATE

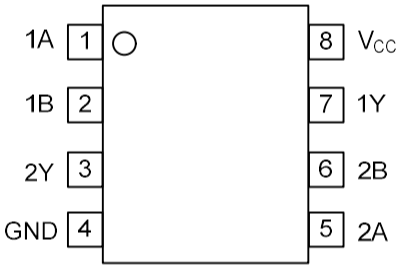
DESCRIPTION

The is a 2-input AND gate which provides the Function Y=A×B.

FEATURES

* Operation voltage range: 2.0V~6.0V
* Low power dissipation: I_{CC} =10μA (Max.)
* High speed: t_{PD}=19ns (Max.) (V_{CC}=4.5V, C_L=50pF)

PIN CONFIGURATION



MSOP-8

PIN DESCRIPTION

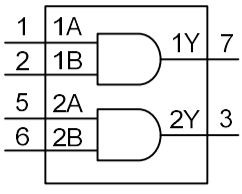
PIN NO.	PIN NAME	DESCRIPTION
1, 5	1A, 2A	Data input
2, 6	1B, 2B	Data input
4	GND	Ground (0V)
3, 7	2Y, 1Y	Data output
8	V_{CC}	Supply voltage

FUNCTION TABLE (each gate)

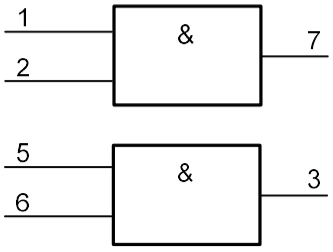
INPUT(A)	INPUT(B)	OUTPUT(Y)
L	L	L
L	H	L
H	L	L
H	H	H

H = HIGH voltage level, L = LOW voltage level.

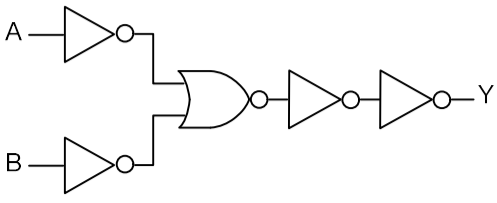
LOGIC DIAGRAM (positive logic)



Logic Symbol



IEC Logic Symbol



Logic Diagram for One Gate

ABSOLUTE MAXIMUM RATINGS (Unless otherwise specified)(Note 1, 2)

PARAMETER	SYMBOL	CONDITIONS	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}	$V_{IN}<0$ or $V_{IN}>V_{CC}$	±20	mA
Output Clamp Current	I_{OK}	$V_{OUT}<0$ or $V_{OUT}>V_{CC}$	±20	mA
Output Current	I_{OUT}	V_{OUT} = 0 to V_{CC}	25	mA
V_{CC} or GND Current	I_{CC}		±50	mA
Power dissipation	P_D		300	mW
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
3. It's guarantee by design, this parameter is not production tested.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2.0		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	t_R, t_F	V_{CC}=2.0V			1000	ns
		V_{CC}=4.5V			500	ns
		V_{CC}=6V			400	ns
Operating Temperature	T_A		-40		+125	°C

Note: It's guarantee by design, this parameter is not production tested.

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V_{IH}	V_{CC}=2.0V	1.5			1.5			V
		V_{CC}=4.5V	3.15			3.15			V
		V_{CC}=6.0V	4.2			4.2			V
Low-Level Input Voltage	V_{IL}	V_{CC}=2.0V			0.5			0.5	V
		V_{CC}=4.5V			1.35			1.35	V
		V_{CC}=6.0V			1.8			1.8	V
High-Level Output Voltage	V_{OH}	V_{CC}=2.0V, I_{OH}=-20μA	1.9			1.9			V
		V_{CC}=4.5V, I_{OH}=-20μA	4.4			4.4			V
		V_{CC}=6.0V, I_{OH}=-20μA	5.9			5.9			V
		V_{CC}=4.5V, I_{OH}=-4mA	4.13			3.7			V
		V_{CC}=6.0V, I_{OH}=-5.2mA	5.63			5.2			V
Low-Level Output Voltage	V_{OL}	V_{CC}=2.0V, I_{OL}=20μA			0.1			0.1	V
		V_{CC}=4.5V, I_{OL}=20μA			0.1			0.1	V
		V_{CC}=6.0V, I_{OL}=20μA			0.1			0.1	V
		V_{CC}=4.5V, I_{OL}=4mA			0.33			0.4	V
		V_{CC}=6.0V, I_{OL}=5.2mA			0.33			0.4	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=6.0V, V_{IN}=V_{CC} or GND			±1			±1	μA
Quiescent Supply Current	I_Q	V_{CC}=6.0V, V_{IN}=V_{CC} or GND, I_{OUT}=0A			10			20	μA
Input Capacitance	C_{IN}			1.5					pF

Note: It's guarantee by design, this parameter is not production tested.

DYNAMIC CHARACTERISTICS (Input: t_R, t_F ≤ 6ns; P_{RR} ≤ 1MHz)

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

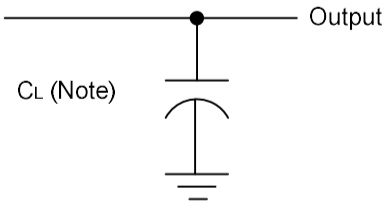
PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (A and B) to Output (Y)	t_{PHL} /t_{PLH}	V_{CC}=2.0V, C_L=50pF			95			125	ns
		V_{CC}=4.5V, C_L=50pF			19			25	ns
		V_{CC}=6.0V, C_L=50pF			16			20	ns
Output Transition Time	t_{THL} /t_{TLH}	V_{CC}=2.0V, C_L=50pF			95			125	ns
		V_{CC}=4.5V, C_L=50pF			19			25	ns
		V_{CC}=6.0V, C_L=50pF			16			20	ns

Note: It's guarantee by design, this parameter is not production tested.

OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load		10		pF

TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

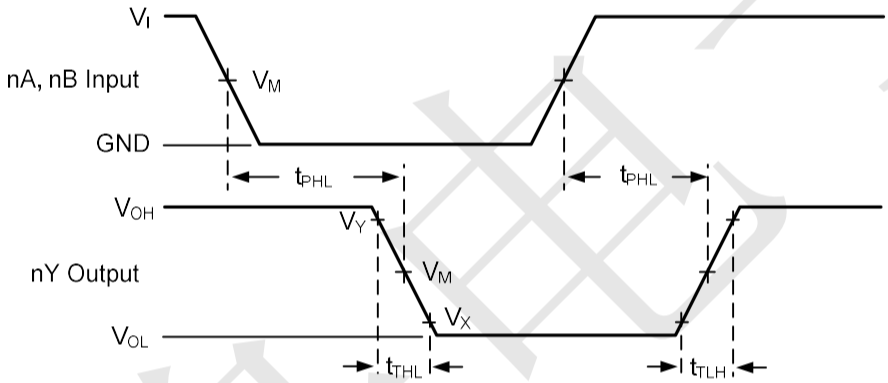
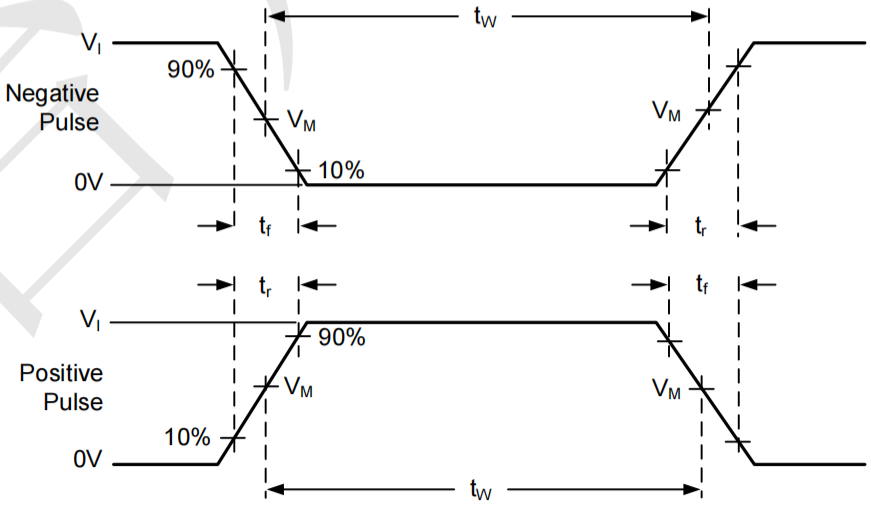


Figure 1. The input (nA and nB) to output (nY) propagation delays

INPUT	OUTPUT		
V_M	V_M	V_X	V_Y
0.5×V_{CC}	0.5×V_{CC}	0.1×V_{CC}	0.9×V_{CC}



TEST CIRCUIT AND WAVEFORMS (Cont.)

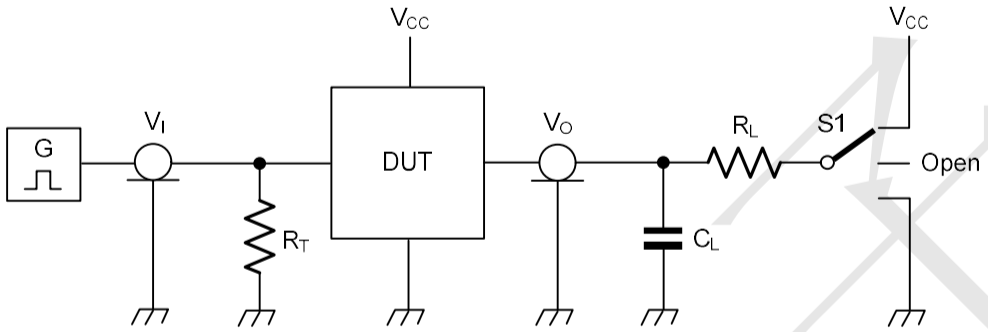
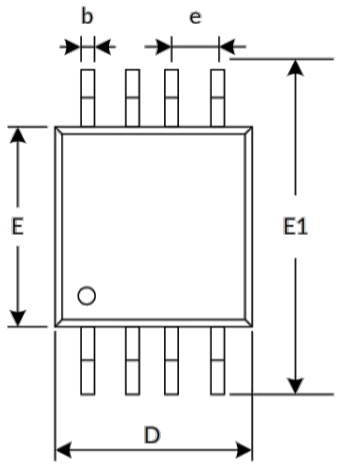


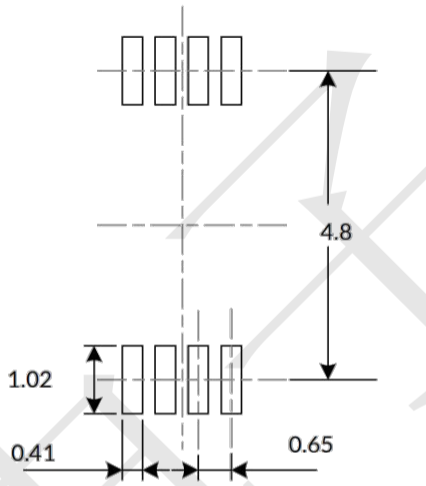
Figure 2. Test circuit for measuring switching times

INPUT		LOAD		S1 POSITION
V_I	t_r, t_f	C_L	R_L	t_{PHL}, t_{PLH}
GND to V_{CC}	≤ 6 ns	15pF, 50pF	1kΩ	Open

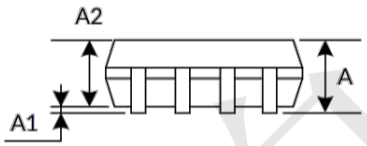
Package information

MSOP-8





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°