M74HC266P

QUADRUPLE 2-INPUT EXCLUSIVE NOR GATE

DESCRIPTION

The M74HC266 is a semiconductor integrated circuit consisting of four 2-input exclusive NOR gates.

FEATURES

- High-speed: 9ns typ. (C_L=15pF, V_{CC}=5V)
- Low power dissipation: 5μW/package (max) (V_{CC}=5V, T_a=25℃, quiescent state)
- High noise margin: 30% of V_{CC}, min (V_{CC}=4.5V, 6V)
- Capable of driving 10 LSTTL loads
- Wide operating voltage range: V_{CC}=2~6V
- Wide operating temperature range: T_a=−40~85℃

APPLICATION

General purpose, for use in industrial and consumer digital equipment.

FUNCTIONAL DESCRIPTION

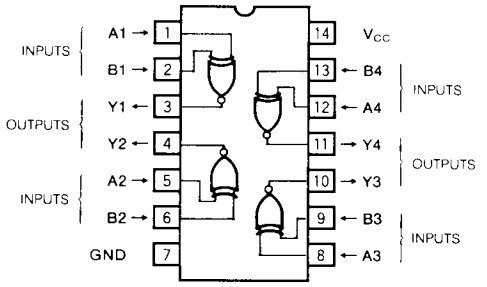
Use of silicon gate technology allows the M74HC266 to maintain the low power dissipation and high noise margin characteristics of the standard CMOS logic 4000B series while giving high-speed performance equivalent to the 74LS266.

Buffered outputs Y improve input-to-output transfer characteristics and reduce to a minimum output impedance variations with respect to input voltage variations.

When both inputs A and B are either high or low, the output Y will become high, and when the levels of A and B are opposite, the output Y will become low.

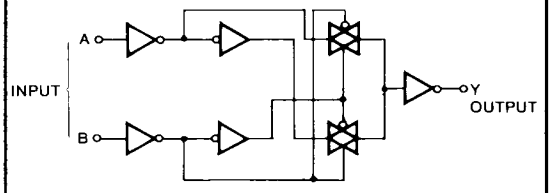
Note that the output of M74HC266 and 74LS266 differ in that the output of the M74HC266 is not open drain.

PIN CONFIGURATION (TOP VIEW)



Outline 14P4

LOGIC DIAGRAM (EACH GATE)



FUNCTION TABLE

Inputs		Output
A	B	Y
L	L	H
H	L	L
L	H	L
H	H	H

ABSOLUTE MAXIMUM RATINGS (T_a = −40~+85℃)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		−0.5~+7.0	V
V_I	Input voltage		−0.5~V_{CC}+0.5	V
V_O	Output voltage		−0.5~V_{CC}+0.5	V
I_{IK}	Input protection diode current	V_I < 0V	−20	mA
		V_I > V_{CC}	20	
I_{OK}	Output parasitic diode current	V_O < 0V	−20	mA
		V_O > V_{CC}	20	
I_O	Output current, per output pin		±25	mA
I_{CC}	Supply/GND current	V_{CC}, GND	±50	mA
P_d	Power dissipation		500	mW
Tstg	Storage temperature range		−65~+150	℃

RECOMMENDED OPERATING CONDITIONS (T_a = −40~+85℃)

Symbol	Parameter		Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage		2		6	V
V_I	Input voltage		0		V_{CC}	V
V_O	Output voltage		0		V_{CC}	V
T_{opr}	Operating temperature range		−40		+85	℃
t_r, t_f	Input risetime, falltime	V_{CC} = 2.0V	0		1000	ns
		V_{CC} = 4.5V	0		500	
		V_{CC} = 6.0V	0		400	

ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions		Limits					Unit
					25℃			−40~+85℃	
				V_{CC}(V)	Min	Typ	Max	Min	Max	
V_{IH}	High-level input voltage	V_O = 0.1V, V_{CC}−0.1V $\|I_O\|$ = 20μA		2.0	1.5			1.5		V
				4.5	3.15			3.15		
				6.0	4.2			4.2		
V_{IL}	Low-level input voltage	V_O = 0.1V, V_{CC}−0.1V $\|I_O\|$ = 20μA		2.0			0.5		0.5	V
				4.5			1.35		1.35	
				6.0			1.8		1.8	
V_{OH}	High-level output voltage	V_I = V_{IH}, V_{IL}	I_{OH} = −20μA	2.0	1.9			1.9		V
			I_{OH} = −20μA	4.5	4.4			4.4		
			I_{OH} = −20μA	6.0	5.9			5.9		
			I_{OH} = −4.0mA	4.5	4.18			4.13		
			I_{OH} = −5.2mA	6.0	5.68			5.63		
V_{OL}	Low-level output voltage	V_I = V_{IH}, V_{IL}	I_{OL} = 20μA	2.0			0.1		0.1	V
			I_{OL} = 20μA	4.5			0.1		0.1	
			I_{OL} = 20μA	6.0			0.1		0.1	
			I_{OL} = 4.0mA	4.5			0.26		0.33	
			I_{OL} = 5.2mA	6.0			0.26		0.33	
I_{IH}	High-level input current	V_I = 6V		6.0			0.1		1.0	μA
I_{IL}	Low-level input current	V_I = 0V		6.0			−0.1		−1.0	μA
I_{CC}	Quiescent supply current	V_I = V_{CC}, GND, I_O = 0μA		6.0			1.0		10.0	μA

SWITCHING CHARACTERISTICS (V_{CC} = 5V, T_a = 25℃)

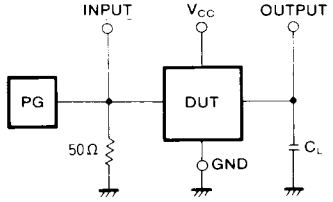
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t_{TLH}	Low-level to high-level and high-level to low-level output transition time	C_L = 15pF (Note 2)			10	ns
t_{THL}					10	
t_{PLH}	Low-level to high-level and high-level to low-level output propagation time				20	ns
t_{PHL}					20	

SWITCHING CHARACTERISTICS (V_{CC} = 2~6V, T_a = −40~+85℃)

Symbol	Parameter	Test conditions		Limits					Unit
				25℃			−40~+85℃		
			V_{CC}(V)	Min	Typ	Max	Min	Max	
t_{TLH}	Low-level to high-level and high-level to low-level output transition time	C_L = 50pF (Note 2)	2.0			75		95	ns
			4.5			15		19	
			6.0			13		16	
t_{THL}			2.0			75		95	
			4.5			15		19	
			6.0			13		16	
t_{PLH}	Low-level to high-level and high-level to low-level output propagation time		2.0			120		151	ns
			4.5			24		30	
			6.0			20		26	
t_{PHL}			2.0			120		151	
			4.5			24		30	
			6.0			20		26	
C_I	Input capacitance					10		10	pF
C_{PD}	Power dissipation capacitance (Note 1)				38				pF

Note 1 : C_{PD} is the internal capacitance of the IC calculated from operation supply current under no-load conditions. (per gate)
The power dissipated during operation under no-load conditions is calculated using the following formula:
$P_D = C_{PD} \cdot V_{CC}^2 \cdot f_I + I_{CC} \cdot V_{CC}$

Note 2 : Test Circuit



(1) The pulse generator (PG) has the following characteristics (10%~90%): t_r = 6ns, t_f = 6ns
(2) The capacitance C_L includes stray wiring capacitance and the probe input capacitance.

TIMING DIAGRAM