

HX4001-S four-way 2-input or No gate

General situation

HX4001-S is a single CMOS integrated circuit with wide voltage range, so it has the advantages of low power consumption, anti-interference and strong flexibility in use. It has symmetrical source and drain current drive capabilities and complies with the HX4001 series output driver standard. These drivers can also buffer the output to provide higher gain and improve conversion performance. A diode is arranged between VDD and VSS to protect all inputs from static current interference.

Main feature

Very wide digital control and transmission of analog signal voltage

Main feature

Wide operating voltage: 3V to 15V

Input levels are compatible with LSTTL

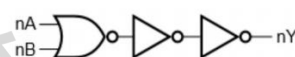
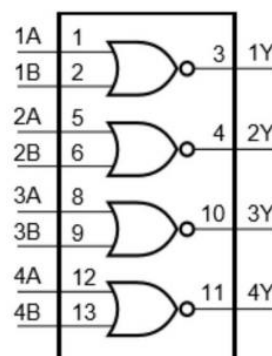
5V, 10V, 15V Three-speed parameter

Symmetrical output capability

Maximum input current: 1μA (15V, All temperature range)

Operating temperature range: -20°C to +85°C。

Internal block diagram and logic diagram (single path)



Pin specification

Pin arrangement	Pin number	Pin name	I/O	Description
	1、5、8、12	nA	I	Input
	2、6、9、13	nB		
	3、4、10、11	nY	O	Exportation
	7	VSS	GND	Ground (0V)
	14	VDD	P	Supply voltage

Logical truth table

Input		Eexportation
nA	nB	nY
L	L	H
L	H	L
H	L	L
H	H	L

Recommended working conditions

Argument	Symbol	Min	Max	Unit
Operating voltage	V_{DD}	3	15	V
Input voltage	V_I	0	V_{DD}	V
Ambient temperature	T_{amb}	-20	+85	°C

Electrical characteristic

Dc parameter (Unless otherwise specified, $T_{amb}=25^{\circ}\text{C}$, $V_I=V_{SS}$ or V_{DD} , $V_{SS}=0\text{V}$)

Argument	Symbol	Test condition			Min	Typ	Max	Unit
		V_O	V_I	V_{DD}				
Supply current	I_{DD}	—	0, 5	5	—	0.01	0.25	uA
		—	0, 10	10	—	0.01	0.5	uA
		—	0, 15	15	—	0.01	1	uA
Low level output current	I_{OL}	0.4	0, 5	5	0.51	1	—	mA
		0.5	0, 10	10	1.3	2.6	—	mA
		1.5	0, 15	15	3.4	6.8	—	mA
		4.6	0, 5	5	-0.51	-1	—	mA
		2.5	0, 5	5	-1.6	-3.2	—	mA

High level output current	I_{OH}	0.5	0, 10	10	-1.3	-2.6	-	mA
		1.5	0, 15	15	-3.4	-6.8	-	mA
Low output voltage	V_{OL}	-	0, 5	5	-	0	0.05	V
		-	0, 10	10	-	0	0.05	V
		-	0, 15	15	-	0	0.05	V
High level output voltage	V_{OH}	-	0, 5	5	4.95	5	-	V
		-	0, 10	10	9.95	10	-	V
		-	0, 15	15	14.95	15	-	V
Low-level input voltage	V_{IL}	0.5, 4.5	-	5	-	-	1.5	V
		1, 9	-	10	-	-	3.0	V
		1.5, 13.5	-	15	-	-	4.0	V
High level input voltage	V_{IH}	0.5	-	5	3.5		-	V
		1	-	10	7.0		-	V
		1.5	-	15	11.0		-	V
Input leakage	I_i	-	0, 15	15	-	$\pm 10^{-5}$	± 0.1	uA

Ac parameter (Unless otherwise specified, $T_{amb}=25^{\circ}C$, $V_{SS}=0V$, $t_r/t_f=20ns$, $C_L=50pF$, $R_L=200K\Omega$)

Argument	Symbol	Test condition		Min	Typ	Max	Unit
Transmission delay time	$t_{\text{PHL}}, t_{\text{PLH}}$	Refer to Figure 2	$V_{\text{DD}}=5\text{V}$	–	125	250	ns
			$V_{\text{DD}}=10\text{V}$	–	60	120	ns
			$V_{\text{DD}}=15\text{V}$	–	45	90	ns
Conversion time	$t_{\text{THL}}, t_{\text{TLH}}$	Refer to Figure 2	$V_{\text{DD}}=5\text{V}$	–	100	200	ns
			$V_{\text{DD}}=10\text{V}$	–	50	100	ns
			$V_{\text{DD}}=15\text{V}$	–	40	80	ns
Input capacitance	C_{I}	Either input		–	5	7.5	pF

Ac test circuit

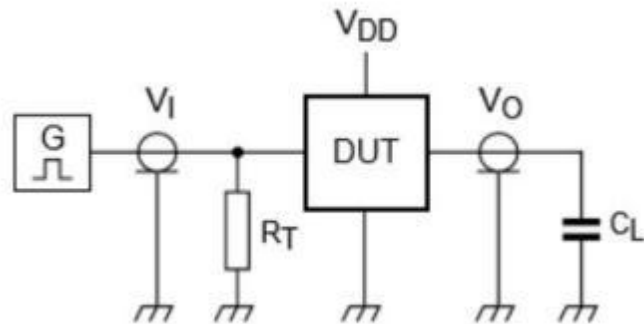


Figure 1: Test circuit for switching time

Note:

DUT=Device under test

C_L =Load capacitance

R_T =The output resistance is equivalent to the output impedance of the pulse generator Z_o

Supply voltage	Input		Load
V_{DD}	V_I	t_r, t_f	C_L
5V~15V	V_{SS} or V_{DD}	$\leq 20\text{ns}$	50pF

Ac test waveform

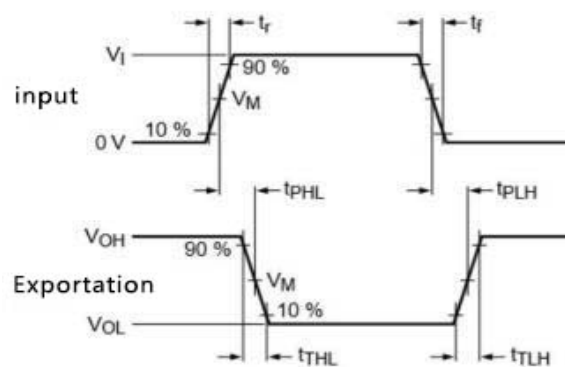
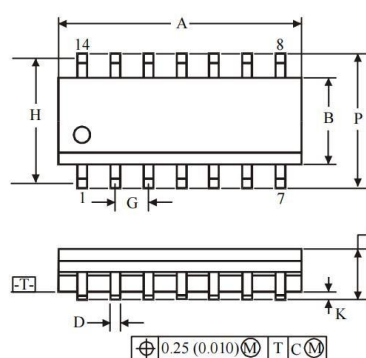


Figure 2: Transmission delay, output conversion time

Supply voltage	Input	Exportation
V_{DD}	V_M	V_M
5V~15V	$0.5V_{DD}$	$0.5V_{DD}$

Encapsulation

SOP14 (Package Outline Dimensions)

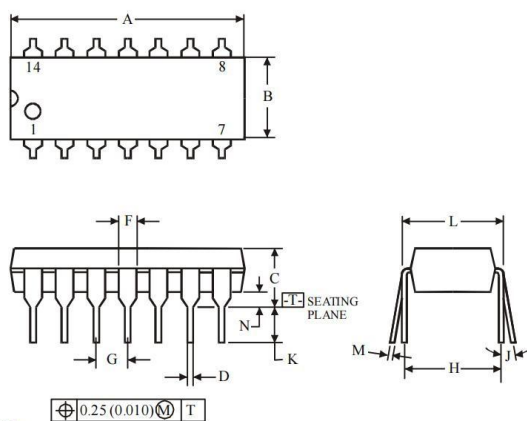


NOTES:

1. Dimensions A and B do not include mold flash or protrusion.
2. Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B - 0.25 mm (0.010) per side.

Symbol	Dimension, mm	
	MIN	MAX
A	8.55	8.75
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.27	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

DIP14 (Package Outline Dimensions)



NOTES:

1. Dimensions "A", "B" do not include mold flash or protrusions.
Maximum mold flash or protrusions 0.25 mm (0.010) per side.

Symbol	Dimension, mm	
	MIN	MAX
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

Part Number	Package Type	Package	quantity
HX4001-S	SOP-14	Taping	2500