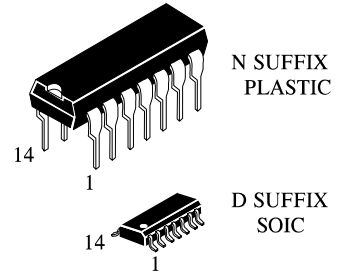


IW4023B

TRIPLE 3-INPUT NAND GATE High-Voltage Silicon-Gate CMOS

The IW4023B NAND gates provide the system designer with direct implementation of the NAND function.

- Operating Voltage Range: 3.0 to 18 V
- Maximum input current of 1 μ A at 18 V over full package-temperature range; 100 nA at 18 V and 25°C
- Noise margin (over full package temperature range):
1.0 V min @ 5.0 V supply
2.0 V min @ 10.0 V supply
2.5 V min @ 15.0 V supply

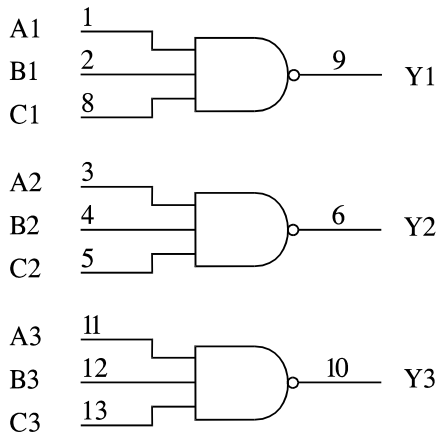


ORDERING INFORMATION

IW4023BN Plastic
IW4023BD SOIC

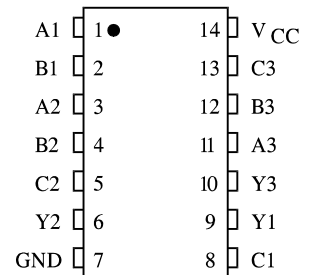
$T_A = -55^\circ$ to 125° C for all packages

LOGIC DIAGRAM



PIN 14 = V_{CC}
PIN 7 = GND

PIN ASSIGNMENT



FUNCTION TABLE

Inputs			Output
A	B	C	Y
L	X	X	H
X	L	X	H
X	X	L	H
H	H	H	L

X = don't care

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MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V _{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +20	V
V _{IN}	DC Input Voltage (Referenced to GND)	-0.5 to V _{CC} +0.5	V
V _{OUT}	DC Output Voltage (Referenced to GND)	-0.5 to V _{CC} +0.5	V
I _{IN}	DC Input Current, per Pin	±10	mA
P _D	Power Dissipation in Still Air, Plastic DIP+ SOIC Package+	750 500	mW
P _D	Dissipation per Output Transistor	100	mW
T _{stg}	Storage Temperature	-65 to +150	°C
T _L	Lead Temperature, 1 mm from Case for 10 Seconds (Plastic DIP or SOIC Package)	260	°C

Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

+Derating - Plastic DIP: - 10 mW/°C from 65° to 125°C

SOIC Package: : - 7 mW/°C from 65° to 125°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage (Referenced to GND)	3.0	18	V
V _{IN} , V _{OUT}	DC Input Voltage, Output Voltage (Referenced to GND)	0	V _{CC}	V
T _A	Operating Temperature, All Package Types	-55	+125	°C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{IN} and V_{OUT} should be constrained to the range $GND \leq (V_{IN} \text{ or } V_{OUT}) \leq V_{CC}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}). Unused outputs must be left open.

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DC ELECTRICAL CHARACTERISTICS (Voltages Referenced to GND)

Symbol	Parameter		Test Conditions	V _{CC} V	Guaranteed Limit			Unit
					≥-55°C	25 °C	≤125 °C	
V _{IH}	Minimum High-Level Input Voltage	High-Input	V _{OUT} =0.5 V or V _{CC} - 0.5 V V _{OUT} =1.0 V or V _{CC} - 1.0 V V _{OUT} =1.5 V or V _{CC} - 1.5 V	5.0	3.5	3.5	3.5	V
				10	7	7	7	
				15	11	11	11	
V _{IL}	Maximum Low-Level Input Voltage	Low-Input	V _{OUT} = V _{CC} - 0.5V V _{OUT} = V _{CC} - 1.0 V V _{OUT} = V _{CC} - 1.5V	5.0	1.5	1.5	1.5	V
				10	3	3	3	
				15	4	4	4	
V _{OH}	Minimum High-Level Output Voltage	High-Output	V _{IN} =GND or V _{CC}	5.0	4.95	4.95	4.95	V
				10	9.95	9.95	9.95	
				15	14.95	14.95	14.95	
V _{OL}	Maximum Low-Level Output Voltage	Low-Output	V _{IN} = V _{CC}	5.0	0.05	0.05	0.05	V
				10	0.05	0.05	0.05	
				15	0.05	0.05	0.05	
I _{IN}	Maximum Input Leakage Current	Input	V _{IN} = GND or V _{CC}	18	±0.1	±0.1	±1.0	μA
I _{CC}	Maximum Quiescent Supply Current (per Package)	Supply	V _{IN} = GND or V _{CC}	5.0	0.25	0.25	7.5	μA
				10	0.5	0.5	15	
				15	1.0	1.0	30	
				20	5.0	5.0	150	
I _{OL}	Minimum Low Output Current (Sink)	Output (Sink)	V _{IN} = GND or V _{CC} U _{OL} =0.4 V U _{OL} =0.5 V U _{OL} =1.5 V	5.0	0.64	0.51	0.36	mA
				10	1.6	1.3	0.9	
				15	4.2	3.4	2.4	
I _{OH}	Minimum High Output Current (Source)	Output (Source)	V _{IN} = GND or V _{CC} U _{OH} =2.5 V U _{OH} =4.6 V U _{OH} =9.5 V U _{OH} =13.5 V	5.0	-2.0	-1.6	-1.15	mA
				5.0	-0.64	-0.51	-0.36	
				10	-1.6	-1.3	-0.9	
				15	-4.2	-3.4	-2.4	

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AC ELECTRICAL CHARACTERISTICS ($C_L=50\text{pF}$, $R_L=200\text{k}\Omega$, Input $t_r=t_f=20\text{ ns}$)

Symbol	Parameter	V_{CC} V	Guaranteed Limit			Unit
			≥ -55 $^{\circ}\text{C}$	25°C	≤ 125 $^{\circ}\text{C}$	
t_{PLH} , t_{PHL}	Maximum Propagation Delay, Input A, B or C to Output Y (Figure 1)	5.0 10 15	250 120 90	250 120 90	500 240 180	ns
t_{TLH} , t_{THL}	Maximum Output Transition Time, Any Output (Figure 1)	5.0 10 15	200 100 80	200 100 80	400 200 160	ns
C_{IN}	Maximum Input Capacitance	-		7.5		pF

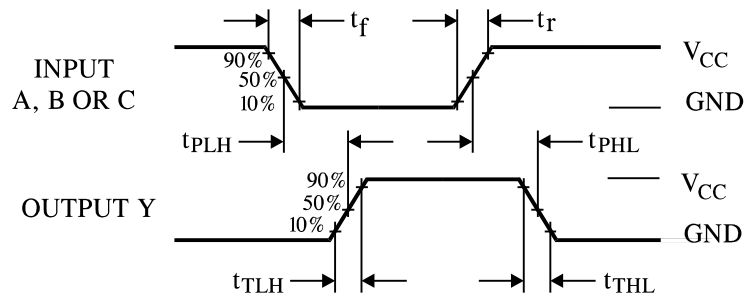


Figure 1. Switching Waveforms

EXPANDED LOGIC DIAGRAM (1/3 of the Device)

