

MN4011B/MN4011BS

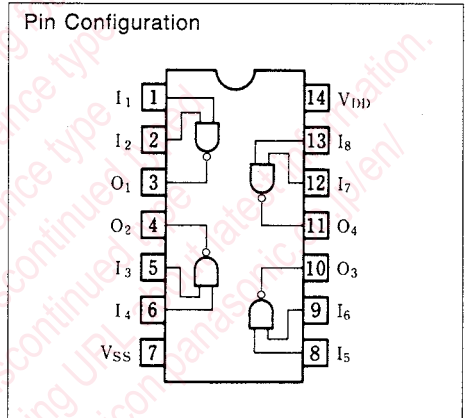
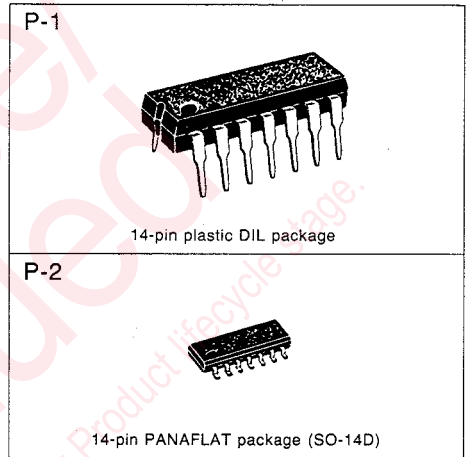
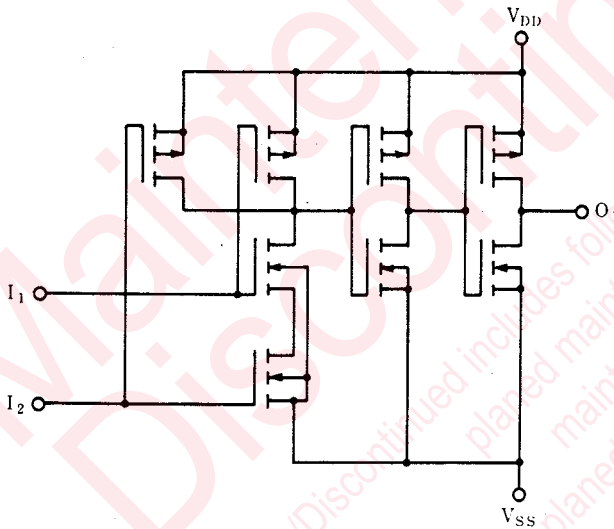
Quad 2-Input NAND Gate

■ Outline

The MN4011B/S is a 2-input positive logic NAND gate having four built-in circuits in one chip. The inverter buffer added to the gate output improves the input/output transfer characteristic and minimizes the propagation delay time fluctuation caused by the load capacity increase.

This NAND gate has a high noise immunity at low power consumption. This is equivalent to Motorola's MC4011B and RCA's CD4011B.

■ Schematic Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit
Supply voltage	V_{DD}	-0.5~+18	V
Input voltage	V_I	-0.5~ $V_{DD}+0.5^*$	V
Output pin voltage	V_O	-0.5~ $V_{DD}+0.5^*$	V
Peak input · output pin current	$\pm I_I$	max. 10	mA
Power dissipation (per package)	Ta=-40~+60°C	max. 400	mW
	Ta=+60~+80°C	Decrease to 200mW at the rate of 8mW/°C	
Power dissipation (per output pin)	P_D	max. 100	mW
Operating ambient temperature	T_{opr}	-40~+85	°C
Storage temperature	T_{stg}	-65~+150	°C

* $V_{DD}+0.5V$ should be lower than 18V.

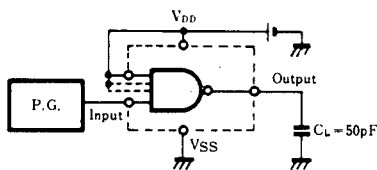
■ DC Characteristics (V_{SS}=0V)

Item	V _{DD} (V)	Symbol	Condition	Ta=-40°C		Ta=25°C		Ta=85°C		Unit
				min.	max.	min.	max.	min.	max.	
Static supply current	5	I _{DD}	V _I =V _{SS} or V _{DD}	—	1	—	1	—	7.5	μA
	10			—	2	—	2	—	15	
	15			—	4	—	4	—	30	
Output voltage low level	5	V _{OL}	V _I =V _{SS} or V _{DD} I _O <1μA	—	0.05	—	0.05	—	0.05	V
	10			—	0.05	—	0.05	—	0.05	
	15			—	0.05	—	0.05	—	0.05	
Output voltage high level	5	V _{OH}	V _I =V _{SS} or V _{DD} I _O <1μA	4.95	—	4.95	—	4.95	—	V
	10			9.95	—	9.95	—	9.95	—	
	15			14.95	—	14.95	—	14.95	—	
Input voltage low level	5	V _{IL}	I _O <1μA V _O =0.5V or 4.5V V _O =1V or 9V V _O =1.5V or 13.5V	—	1.5	—	1.5	—	1.5	V
	10			—	3	—	3	—	3	
	15			—	4	—	4	—	4	
Input voltage high level	5	V _{IH}	I _O <1μA V _O =0.5V or 4.5V V _O =1V or 9V V _O =1.5V or 13.5V	3.5	—	3.5	—	3.5	—	V
	10			7	—	7	—	7	—	
	15			11	—	11	—	11	—	
Output current low level	5	I _{OL}	V _O =0.4V, V _I =0 or 5V V _O =0.5V, V _I =0 or 10V V _O =1.5V, V _I =0 or 15V	0.52	—	0.44	—	0.36	—	mA
	10			1.3	—	1.1	—	0.9	—	
	15			3.6	—	3	—	2.4	—	
Output current high level	5	-I _{OH}	V _O =4.6V, V _I =0 or 5V V _O =9.5V, V _I =0 or 10V V _O =13.5V, V _I =0 or 15V	0.52	—	0.44	—	0.36	—	mA
	10			1.3	—	1.1	—	0.9	—	
	15			3.6	—	3	—	2.4	—	
Output current high level	5	-I _{OH}	V _O =2.5V, V _I =0 or 5V	1.7	—	1.4	—	1.1	—	mA
Input leakage current	15	±I _I	V _I =0 or 15V	—	0.3	—	0.3	—	1	μA

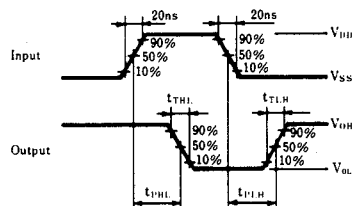
■ Switching Characteristics (Ta=25°C, V_{SS}=0V, C_L=50pF)

Item	V _{DD} (V)	Symbol	min.	typ.	max.	Unit
Output rise time	5	t _{TLH}	—	60	180	ns
	10		—	30	90	
	15		—	20	60	
Output fall time	5	t _{THL}	—	60	180	ns
	10		—	30	90	
	15		—	20	60	
Propagation time	5	t _{PLH}	—	55	165	ns
	10		—	25	75	
	15		—	20	60	
Propagation time	5	t _{PHL}	—	55	165	ns
	10		—	25	75	
	15		—	20	60	
Input capacitance		C _I	—	—	7.5	pF

1. Switching Time Measuring Circuit



2. Switching Waveforms



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