

General Description

The MC14011BDR2G is a quad 2 - input NAND gate. The outputs are fully buffered for the highest noise immunity and pattern insensitivity to output impedance.

It operates over a recommended VDD power supply range of 3 V to 15 V referenced to VSS (usually ground) . Unused inputs must be connected to VDD, VSS, or another input.

Features

- Wide supply voltage range from 3 V to 15 V
- Fully static operation
- 5V, 10V, and 15V parametric ratings
- Standardized symmetrical output characteristics
- Inputs and outputs are protected against electrostatic effects
- Specified from -40° C to + 105° C
- Packaging information: SOP14

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW MC14011BDR2G	SOP-14	14011	Tape	2500Pcs/Reel

Block Diagram And Pin Description

Block Diagram



Figure 1 . Functional diagram

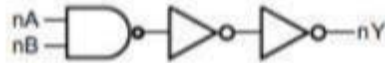
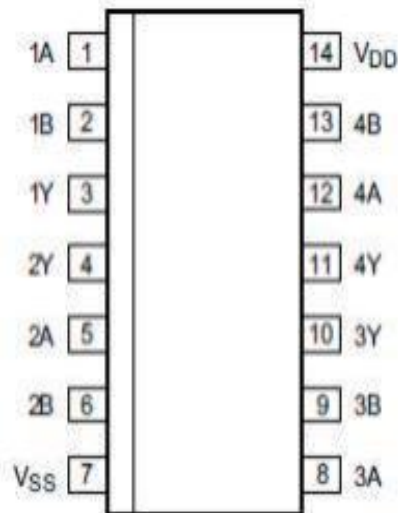


Figure 2 . Logic diagram (one gate)

Pin Configurations



Pin Description

Pin No.	Pin Name	Description
1	1A	data input
2	1B	data input
3	1Y	data output
4	2Y	data output
5	2A	data input
6	2B	data input
7	V _{SS}	ground (0 V)
8	3A	data input
9	3B	data input
10	3Y	data output
11	4Y	data output
12	4A	data input
13	4B	data input
14	V _{DD}	supply voltage

Function Table

Input		Output
nA	nB	nY
L	L	H
L	H	H
H	L	H
H	H	L

Note: H= HIGH voltage level; L= LOW voltage level.

ElectricalParameter

Absolute Maximum Ratings

(Voltages are referenced to V_{SS} (ground=0 V) , unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Max	Unit
supply voltage	V _{DD}		-0.5	+ 18	V
DC input current	I _{IK}	any one input	-	± 10	mA
input voltage	V _I	all inputs	-0.5	V _{DD} +0.5	V
storage temperature	T _{stg}		-65	+ 150	°C
total power dissipation	P _{tot}		-	500	mW
device dissipation	P	per output transistor	-	100	mW
Soldering temperature	T _L	10s	DIP	245	°C
			SOP	250	

Note:

[1] For DIP14 packages: above 70°C the value of P_{tot} derates linearly with 12 mW/K. [2] For SOP14 packages: above 70°C the value of P_{tot} derates linearly with 8 mW/ K.

[3] For (T) SSOP14 packages: above 60°C the value of P_{tot} derates linearly with 5 . 5mW/ K.

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
supply voltage	V_{DD}	-	3	-	15	V
ambient temperature	T_{amb}	in free air	-40	-	+ 105	C

Electrical Characteristics
DC Characteristics 1

 ($T_{amb}=25^{\circ}C$, voltages are referenced to V_{SS} (ground= 0 V) , unless otherwise specified.)

Parameter	Symbol	Conditions (V)			$T_{amb}=25^{\circ}C$			Unit
		V_O	V_{IN}	V_{DD}	Min.	Typ.	Max.	
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
HIGH- level output current	I_{OH}	4.6	0, 5	5	-0.51	- 1	-	mA
		2.5	0, 5	5	- 1.6	-3.2	-	mA
		9.5	0, 10	10	- 1.3	-2.6	-	mA
		13.5	0, 15	15	-3.4	-6.8	-	mA
LOW- level 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}	4.5	-	5	-	-	1.5	V
		9	-	10	-	-	3	V
		13.5	-	15	-	-	4	V
HIGH- level input voltage	V_{IH}	0.5, 4.5	-	5	3.5	-	-	V
		1, 9	-	10	7	-	-	V
		1.5, 13.5	-	15	11	-	-	V
input leakage current	I_I	-	0, 15	15	-	$\pm 10^{-5}$	± 0.1	uA

DC Characteristics 2

($T_{amb} = -40^{\circ}C$ to $+105^{\circ}C$, voltages are referenced to V_{SS} (ground=0 V), unless otherwise specified.)

Parameter	Symbol	Conditions (V)			$T_{amb} = -40^{\circ}C$		$T_{amb} = +85^{\circ}C$		$T_{amb} = +105^{\circ}C$		Unit
		V_O	V_{IN}	V_{DD}	Min.	Max.	Min.	Max.	Min.	Max.	
supply current	I_{DD}	-	0, 5	5	-	0.25	-	7.5	-	7.5	μA
		-	0, 10	10	-	0.5	-	15	-	15	μA
		-	0, 15	15	-	1	-	30	-	30	μA
LOW- level output current	I_{OL}	0.4	0, 5	5	0.61	-	0.42	-	0.36	-	mA
		0.5	0, 10	10	1.5	-	1.1	-	0.9	-	mA
		1.5	0, 15	15	4	-	2.8	-	2.4	-	mA
HIGH- level output current	I_{OH}	4.6	0, 5	5	-0.61	-	-0.42	-	-0.36	-	mA
		2.5	0, 5	5	- 1.8	-	- 1.3	-	- 1.15	-	mA
		9.5	0, 10	10	- 1.5	-	- 1.1	-	-0.9	-	mA
		13.5	0, 15	15	-4	-	-2.8	-	-2.4	-	mA
LOW- level output voltage	V_{OL}	-	0, 5	5	-	0.05	-	0.05	-	0.05	V
		-	0, 10	10	-	0.05	-	0.05	-	0.05	V
		-	0, 15	15	-	0.05	-	0.05	-	0.05	V
HIGH- level output voltage	V_{OH}	-	0, 5	5	4.95	-	4.95	-	4.95	-	V
		-	0, 10	10	9.95	-	9.95	-	9.95	-	V
		-	0, 15	15	14.95	-	14.95	-	14.95	-	V
LOW- level input voltage	V_{IL}	4.5	-	5	-	1.5	-	1.5	-	1.5	V
		9	-	10	-	3	-	3	-	3	V
		13.5	-	15	-	4	-	4	-	4	V
HIGH- level input voltage	V_{IH}	0.5, 4.5	-	5	3.5	-	3.5	-	3.5	-	V
		1, 9	-	10	7	-	7	-	7	-	V
		1.5, 13.5	-	15	11	-	11	-	11	-	V
input leakage current	I_i	-	0, 15	15	-	± 0.1	-	± 1	-	± 1	μA

AC Characteristics

($T_{amb} = 25^{\circ}C$, $V_{SS} = 0V$, $t_r, t_f = 20ns$, $C_L = 50pF$, $R_L = 200k\Omega$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit	
propagation delay time	t_{PHL}, t_{PLH}	see Figure 4	$V_{DD} = 5V$	-	125	250	ns
			$V_{DD} = 10V$	-	60	120	ns
			$V_{DD} = 15V$	-	45	90	ns
transition time	t_{THL}, t_{TLH}	see Figure 4	$V_{DD} = 5V$	-	100	200	ns
			$V_{DD} = 10V$	-	50	100	ns
			$V_{DD} = 15V$	-	40	80	ns
input capacitance	C_i	any input	-	5	7.5	pF	

Testing Circuit

AC Testing Circuit

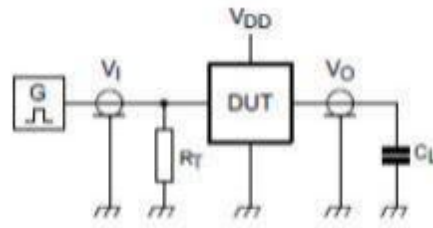


Figure 3 . Test circuit for switching times

Definitions for test circuit:

DUT= Device Under Test.

C_L = Load capacitance including jig and probe capacitance.

R_T = Termination resistance should be equal to the output impedance Z_o of the pulse generator.

AC Testing Waveforms

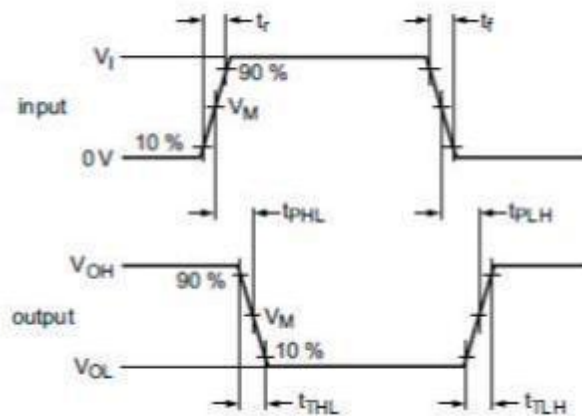


Figure 4 . Propagation delay, output transition time

Measurement Points

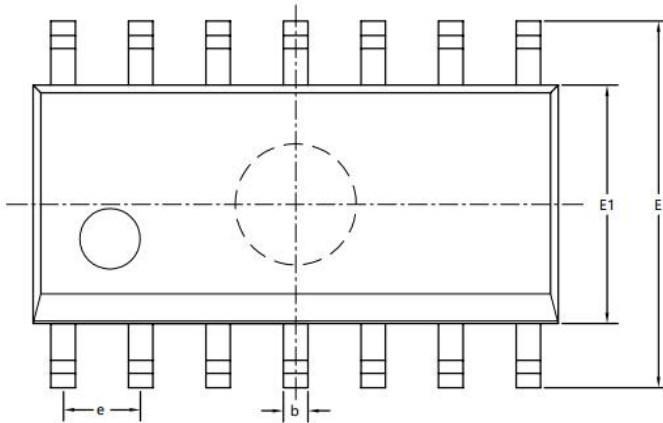
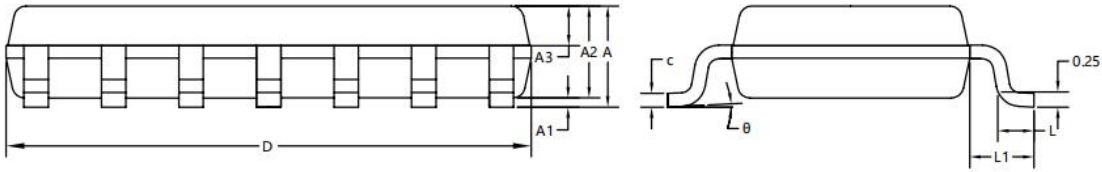
Supply voltage	Input	Output
V_{DD}	V_M	V_M
5V to 15V	$0.5 \times V_{DD}$	$0.5 \times V_{DD}$

Test Data

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

Package Information

SOP14



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.50	1.60	1.70
A1	0.10	0.15	0.25
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.35	0.40	0.45
c	0.15	0.20	0.25
D	8.50	8.60	8.70
E	5.80	6.00	6.20
E1	3.85	3.90	3.95
e	1.27BSC		
L	0.50	0.60	0.70
L1	1.05REF		
θ	0°	4°	8°

Statement:

- ✧ Shenzhen xinbole electronics co., ltd. reserves the right to change the product specifications, without notice!
Before placing an order, the customer needs to confirm whether the information obtained is the latest version, and verify the integrity of the relevant information.
- ✧ Any semiconductor product is liable to fail or malfunction under certain conditions, and the buyer shall be responsible for complying with safety standards in the system design and whole machine manufacturing using Shenzhen xinbole electronics co., ltd products, and take appropriate security measures to avoid the potential risk of failure may result in personal injury or property losses of the situation occurred!
- ✧ This document is for reference only, and the actual use should be based on the application test results.
- ✧ Product performance is never ending, Shenzhen xinbole electronics co., ltd will be dedicated to provide customers with better performance, better quality of integrated circuit products.