

CD4011 CMOS Quad 2 Input NAND Gates

1. General Description

1.1 Description

This device NAND gates provide the system designer with direct implementation of the NAND function and supplement the existing family of CMOS gates. All inputs and outputs are buffered.

1.2 Features

- Buffered inputs and outputs
- Standardized symmetrical output

characteristics

- 100% tested for quiescent current at 18V
- 5V ,10V, and 15V parametric ratings

1.3 Device Information

PART NUMBER	PACKAGE
CD4011	DIP
	SOP
	TSSOP

2. Connection Diagrams and Pin Description

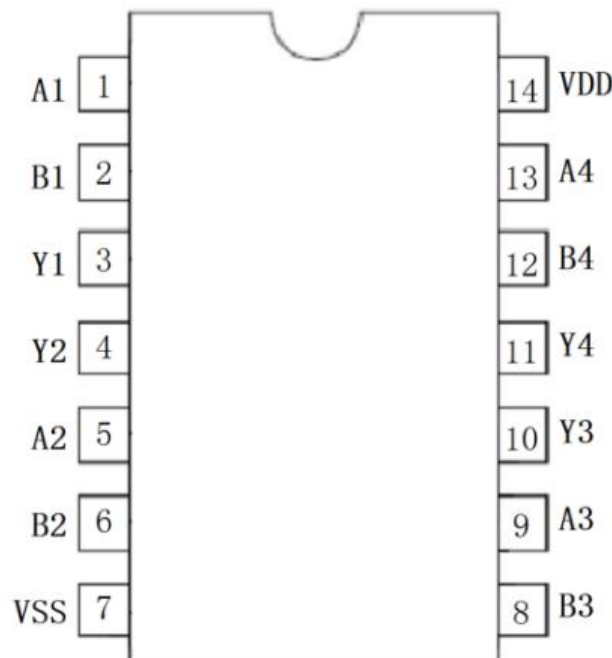


Figure 2.1 Top View



NAME	PIN	I/O	DESCRIPTION
A1	1	Input	Channel 1, Input A
B1	2	Input	Channel 1, Input B
Y1	3	Output	Channel 1,Output Y
Y2	4	Output	Channel 2,Output Y
A2	5	Input	Channel 2, Input A
B2	6	Input	Channel 2, Input B
VSS	7	-	Ground
B3	8	Output	Channel 3, Input B
A3	9	Input	Channel 3, Input A
Y3	10	Input	Channel 3,Output Y
Y4	11	Output	Channel 4,Output Y
B4	12	Input	Channel 4, Input B
A4	13	Input	Channel 4, Input A
V_{DD}	14	-	Positive Supply

3. System Diagram

3.1 Logic Diagram

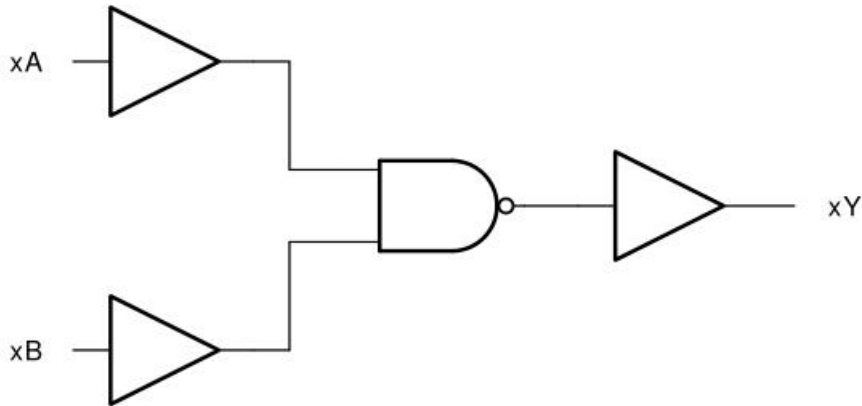


Figure 3.1: CD4011 Logic Diagram

3.2 Truth Table

Inputs		Output
A	B	Y
1	1	0
0	X	1
X	0	1

1=High State, 0=Low State ,X = Don't Care

4. Specifications

4.1 Absolute Maximum Ratings

Symbol	Parameter	MIN	MAX	Unit
V _{DD}	Supply Voltage	-0.5	20	V
V _{IN}	Input Voltage	-0.5	V _{DD} +0.5	V
P _D	Power Dissipation		500	mW
T _J	Junction Temperature		125	°C
T _{OP}	Operating Temperature	-40	85	°C

Absolute maximum ratings are those values beyond which the device could be permanently damaged, These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions.



4.2 Electrical Characteristics

4.2.1 DC Specifications

($T_a=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Symbol	Parameter	Test Condition			MIN	TYP	MAX	Unit
		VO	VIN	VDD				
I _{DD}	Supply Current	--	0,5	5	--	0	6	uA
		--	0,10	10	--	0	6	uA
		--	0,18	18	--	0	10	uA
I _{OL}	Low Level Output Current	0.4	0,5	5	0.51	1.5	--	mA
		0.5	0,10	10	1.5	3.5	--	mA
		1.5	0,15	15	5	10	--	mA
I _{OH}	High Level Output Current	4.6	0,5	5	-0.51	-1	--	mA
		2.5	0,5	5	-2	-4	--	mA
		9.5	0,10	10	-1	-2	--	mA
		13.5	0,15	15	-4	-8	--	mA
V _{OL}	Low Level Output Voltage	--	0,5	5	--	0	0.05	V
		--	0,10	10	--	0	0.05	V
		--	0,15	15	--	0	0.05	V
V _{OH}	High Level Output Voltage	--	0,5	5	4.95	5	--	V
		--	0,10	10	9.95	10	--	V
		--	0,15	15	14.95	15	--	V
V _{IL}	Low Level Input Voltage	0.5,4.5	--	5	--	--	1.5	V
		1,9	--	10	--	--	3	V
		1.5,13.5	--	15	--	--	4	V
V _{IH}	High Level Input Voltage	0.5,4.5	--	5	3.5	--	--	V
		1,9	--	10	7	--	--	V
		1.5,13.5	--	15	11	--	--	V
I _{IN}	Input Leakage Current	--	0,18	18	--	0	±2	uA

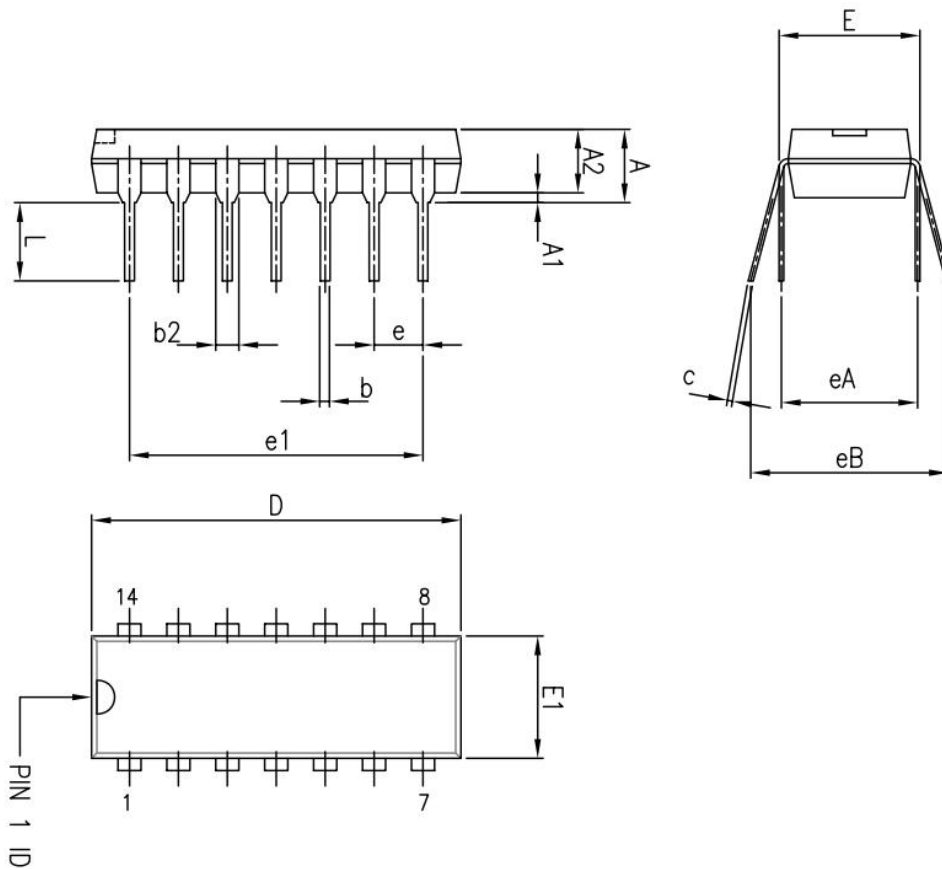


5. Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
CD4011ND14ATBE	DIP	14	Tube	25
CD4011NS14ARDQ	SOP	14	Tape & Reel	4000
CD4011TS14ARDQ	TSSOP	14	Tape & Reel	4000

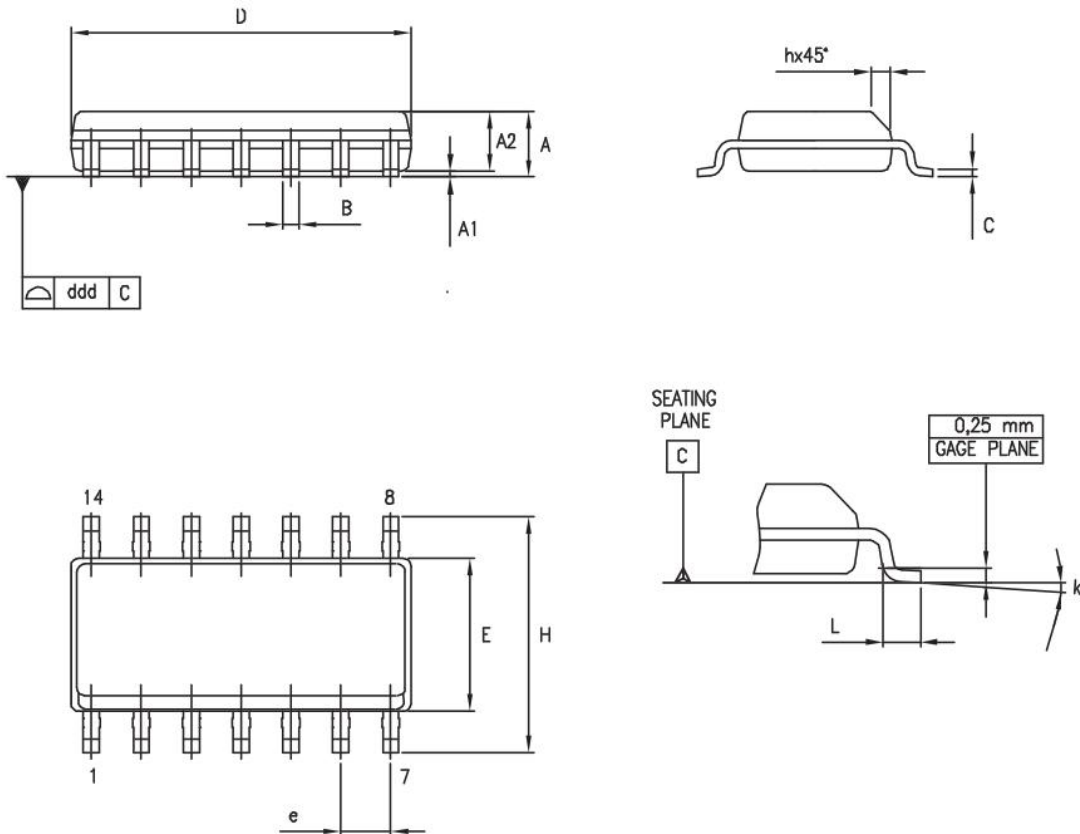
6. Package Information

6.1 DIP14



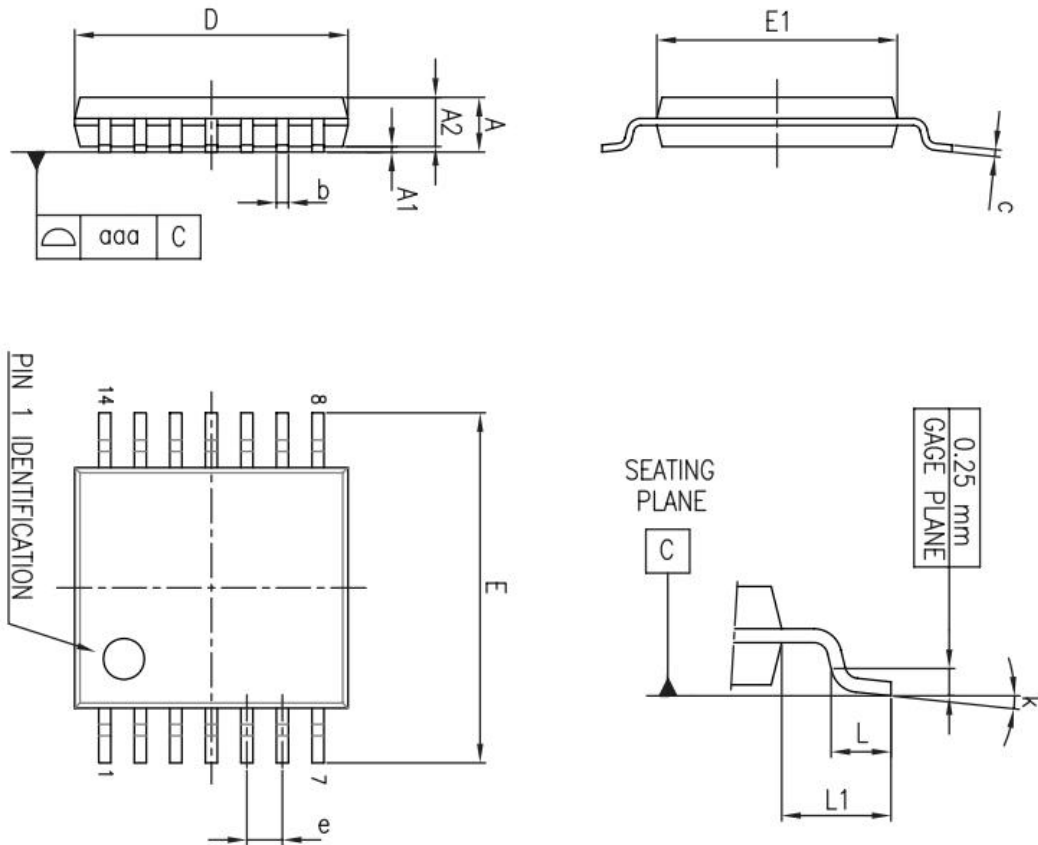
Dimensions						
Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.33			0.21
A1	0.38			0.015		
A2	2.92	3.30	4.95	0.11	0.13	0.19
b	0.36	0.46	0.56	0.014	0.018	0.022
b2	1.14	1.52	1.78	0.04	0.06	0.07
c	0.20	0.25	0.36	0.007	0.009	0.01
D	18.67	19.05	19.69	0.73	0.75	0.77
E	7.62	7.87	8.26	0.30	0.31	0.32
E1	6.10	6.35	7.11	0.24	0.25	0.28
e		2.54			0.10	
e1		15.24			0.60	
eA		7.62			0.30	
eB			10.92			0.43
L	2.92	3.30	3.81	0.11	0.13	0.15

6.2 SOP14



Dimensions						
Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.35		1.75	0.05		0.068
A1	0.10		0.25	0.004		0.009
A2	1.10		1.65	0.04		0.06
B	0.33		0.51	0.01		0.02
C	0.19		0.25	0.007		0.009
D	8.55		8.75	0.33		0.34
E	3.80		4.0	0.15		0.15
e		1.27			0.05	
H	5.80		6.20	0.22		0.24
h	0.25		0.50	0.009		0.02
L	0.40		1.27	0.015		0.05
k	8° (max.)					
ddd			0.10			0.004

6.3 TSSOP14



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.20			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.80	1.00	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.90	5.00	5.10	0.193	0.197	0.201
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.169	0.173	0.176
e		0.65			0.0256	
L	0.45	0.60	0.75	0.018	0.024	0.030
L1		1.00			0.039	
k	0°		8°	0°		8°
aaa			0.10			0.004