CD4078(LX)
8-Input Or Gate/Nor Gate

Product Specification

Specification Revision History：

Version	Date	Description
2023-06-A1	2023-06	New
2024-09-B1	2024-09	Update the template; Modify the parameters

Contents

1、General Description

The CD4078 is an 8-input Or Gate/Nor Gate.

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

Features:

- Supply voltage range:3V to 15V
- Temperature range:-40℃ to +125℃
- Packaging information: DIP14/SOP14/TSSOP14

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
CD4078BE(LX)	DIP14	CD4078BE	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
CD4078BM(LX)	SOP14	CD4078BM	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
CD4078PW(LX)	TSSOP14	CD4078	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
CD4078BM(LX)	SOP14	CD4078BM	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
CD4078PW(LX)	TSSOP14	CD4078	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.

2、Block Diagram And Pin Description

2.1、Block Diagram

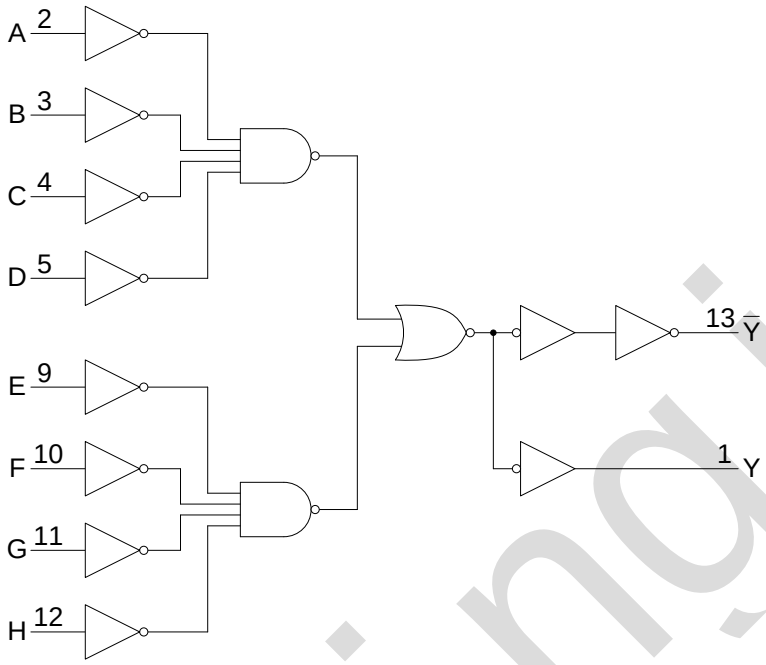
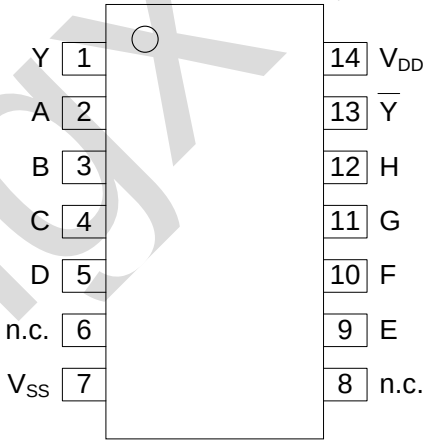


Figure 1. Block Diagram

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	Y	data output
2	A	data input
3	B	data input
4	C	data input
5	D	data input
6	n.c.	not connected
7	V_{SS}	ground (0V)
8	n.c.	not connected
9	E	data input
10	F	data input
11	G	data input
12	H	data input
13	$\overline{Y}$	data output
14	V_{DD}	supply voltage

2.4、Function Table

Input								Output	
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Y**	$\overline{\mathbf{Y}}$
L	L	L	L	L	L	L	L	L	H
H	X	X	X	X	X	X	X	H	L
X	H	X	X	X	X	X	X	H	L
X	X	H	X	X	X	X	X	H	L
X	X	X	H	X	X	X	X	H	L
X	X	X	X	H	X	X	X	H	L
X	X	X	X	X	H	X	X	H	L
X	X	X	X	X	X	H	X	H	L
X	X	X	X	X	X	X	H	H	L

Note: H=HIGH voltage level; L=LOW voltage level; X=don’t care.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(Voltages are referenced to V_{SS} (ground=0V), 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	℃
Soldering temperature	T_L	10s	DIP	245		℃
			SOP/TSSOP	260		

3.2、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	-	+125	℃

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

(T_{amb}=-40℃ to +85℃, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	V_{DD}	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	5V	-	3.5	-	-	V
		10V	-	7	-	-	V
		15V	-	11	-	-	V
LOW-level input voltage	V_{IL}	5V	-	-	-	1.5	V
		10V	-	-	-	3	V
		15V	-	-	-	4	V
HIGH-level output voltage	V_{OH}	5V	$\|I_O\|$<1uA	4.95	-	-	V
		10V	$\|I_O\|$<1uA	9.95	-	-	V
		15V	$\|I_O\|$<1uA	14.95	-	-	V
LOW-level output voltage	V_{OL}	5V	$\|I_O\|$<1uA	-	-	0.05	V
		10V	$\|I_O\|$<1uA	-	-	0.05	V
		15V	$\|I_O\|$<1uA	-	-	0.05	V
HIGH-level output current	I_{OH}	5V	V_O=4.6V	-	-	-0.42	mA
		5V	V_O=2.5V	-	-	-1.3	mA
		10V	V_O=9.5V	-	-	-1.1	mA
		15V	V_O=13.5V	-	-	-2.8	mA
LOW-level output current	I_{OL}	5V	V_O=0.4V	0.42	-	-	mA
		10V	V_O=0.5V	1.1	-	-	mA
		15V	V_O=1.5V	2.8	-	-	mA
input leakage current	I_I	15V	V_I=15V or GND	-	-	±1	uA
supply current	I_{DD}	5V	V_I=5V or GND; I_O=0A	-	-	7.5	uA
		10V	V_I=10V or GND; I_O=0A	-	-	15	uA
		15V	V_I=15V or GND; I_O=0A	-	-	30	uA

3.3.2、DC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	V_{DD}	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	5V	-	3.5	-	-	V
		10V	-	7	-	-	V
		15V	-	11	-	-	V
LOW-level input voltage	V_{IL}	5V	-	-	-	1.5	V
		10V	-	-	-	3	V
		15V	-	-	-	4	V
HIGH-level output voltage	V_{OH}	5V	$\|I_O\|$<1uA	4.95	-	-	V
		10V	$\|I_O\|$<1uA	9.95	-	-	V
		15V	$\|I_O\|$<1uA	14.95	-	-	V
LOW-level output voltage	V_{OL}	5V	$\|I_O\|$<1uA	-	-	0.05	V
		10V	$\|I_O\|$<1uA	-	-	0.05	V
		15V	$\|I_O\|$<1uA	-	-	0.05	V
HIGH-level output current	I_{OH}	5V	V_O=4.6V	-	-	-0.36	mA
		5V	V_O=2.5V	-	-	-1.15	mA
		10V	V_O=9.5V	-	-	-0.9	mA
		15V	V_O=13.5V	-	-	-2.4	mA
LOW-level output current	I_{OL}	5V	V_O=0.4V	0.36	-	-	mA
		10V	V_O=0.5V	0.9	-	-	mA
		15V	V_O=1.5V	2.4	-	-	mA
input leakage current	I_I	15V	V_I=15V or GND	-	-	±1	uA
supply current	I_{DD}	5V	V_I=5V or GND; I_O=0A	-	-	7.5	uA
		10V	V_I=10V or GND; I_O=0A	-	-	15	uA
		15V	V_I=15V or GND; I_O=0A	-	-	30	uA

3.3.3、AC Characteristics 1

(T_{amb}=-40℃ to +85℃, V_{SS}=0V, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
propagation delay time	t_{PHL}, t_{PLH}	see Figure 3	V_{DD}=5V	-	150	300	ns
			V_{DD}=10V	-	75	150	ns
			V_{DD}=15V	-	55	110	ns
transition time	t_{THL}, t_{TLH}	see Figure 3	V_{DD}=5V	-	100	200	ns
			V_{DD}=10V	-	50	100	ns
			V_{DD}=15V	-	40	80	ns

3.3.4、AC Characteristics 2

(T_{amb}=-40℃ to +125℃, V_{SS}=0V, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
propagation delay time	t_{PHL}, t_{PLH}	see Figure 3	V_{DD}=5V	-	-	360	ns
			V_{DD}=10V	-	-	180	ns
			V_{DD}=15V	-	-	132	ns
transition time	t_{THL}, t_{TLH}	see Figure 3	V_{DD}=5V	-	-	240	ns
			V_{DD}=10V	-	-	120	ns
			V_{DD}=15V	-	-	96	ns

4、Testing Circuit

4.1、AC Testing Circuit

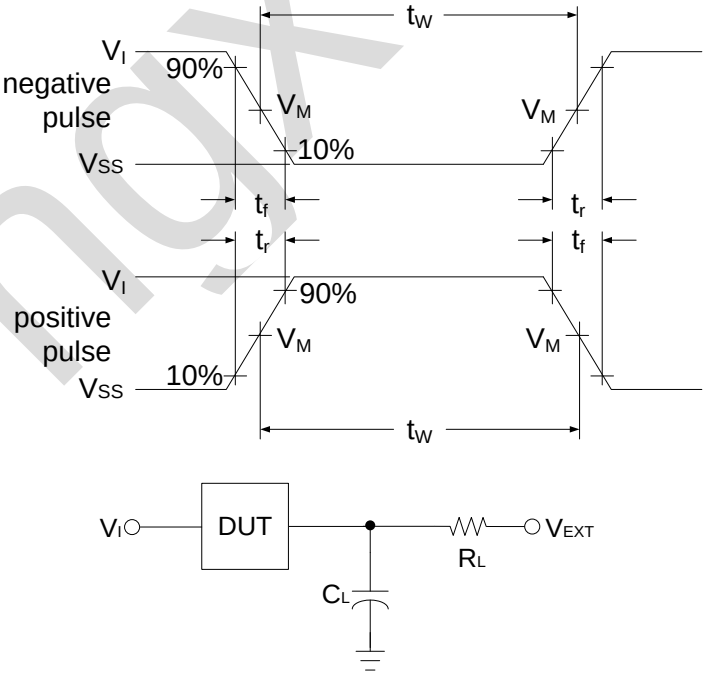


Figure 2. Load circuit

C_L includes probe and jig capacitance.

4.2、Test Data

Supply voltage	Input		Load		V_{EXT}		
V_{DD}	V_I	$t_r = t_f$	C_L	R_L	t_{PLH}/t_{PHL}	t_{PLZ}/t_{PZL}	t_{PHZ}/t_{PZH}
5V to 15V	V_{CC}	≤ 3ns	50pF	200kΩ	Open	V_{DD}	V_{SS}

4.3、AC Testing Waveforms

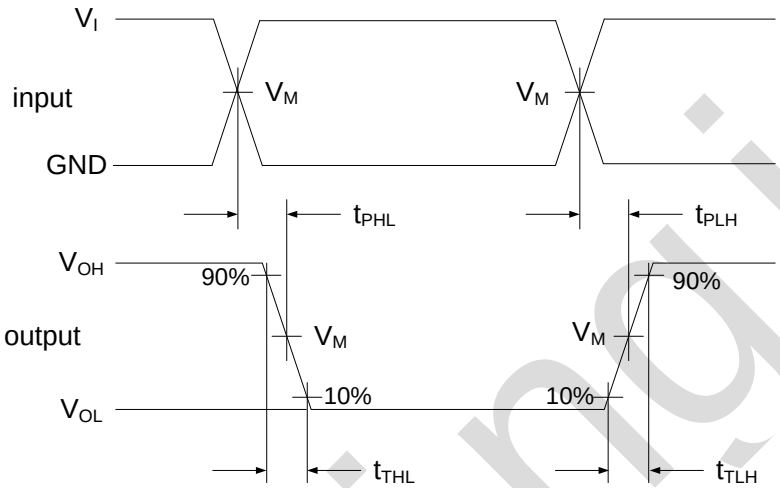


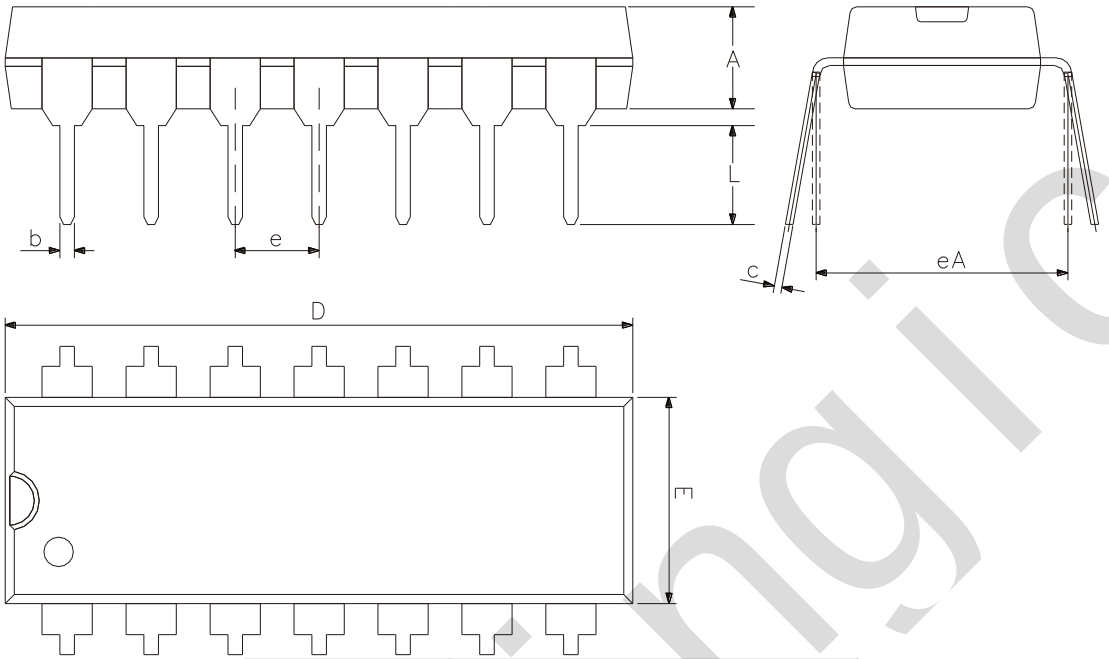
Figure 3. Propagation delay, output transition time

4.4、Measurement Points

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

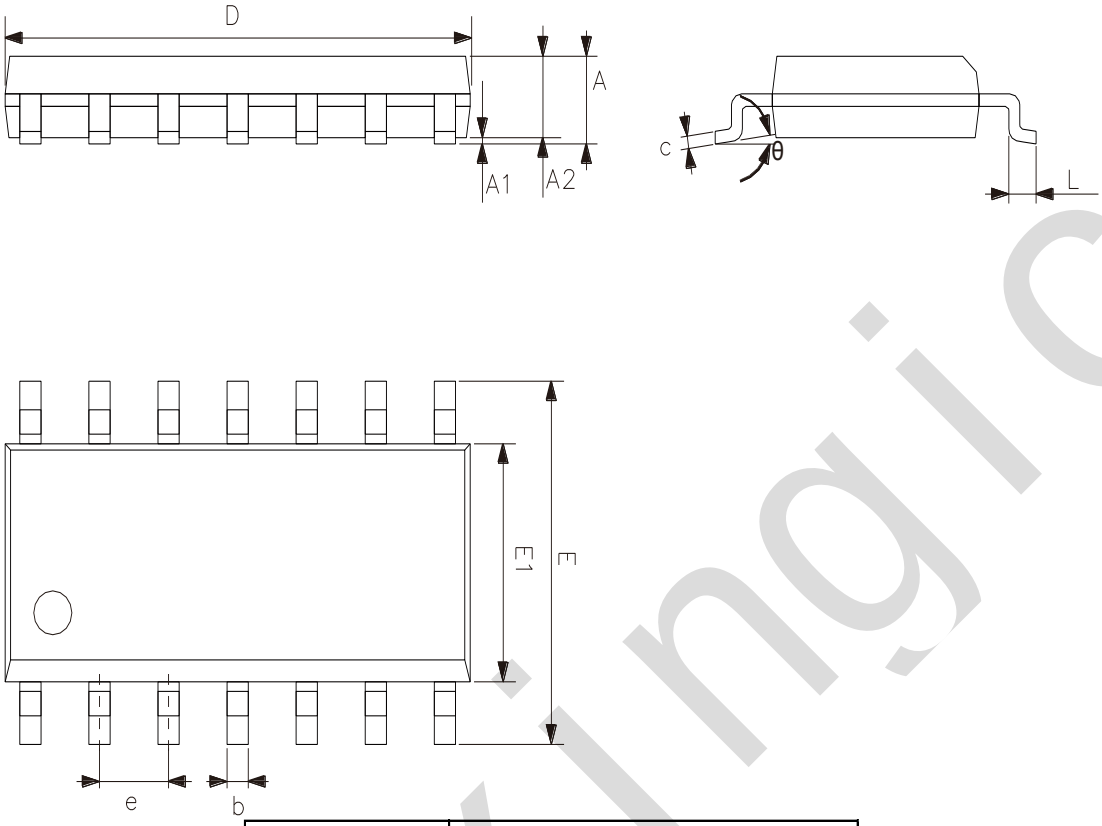
5、Package Information

5.1、DIP14



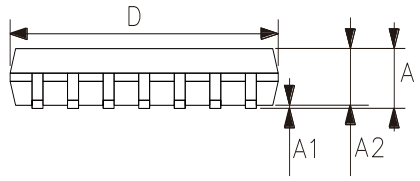
2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	3.05	3.60
b	0.33	0.56
c	0.20	0.36
D	18.80	19.40
E	6.20	6.60
e	2.54	
eA	7.62	10.90
L	2.92	—

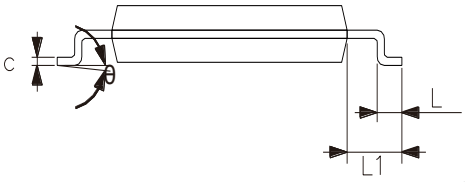
5.2、SOP14

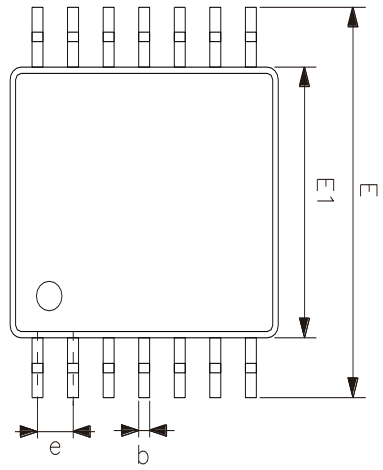


2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	1.50	1.75
A1	0.05	0.25
A2	1.30	—
b	0.33	0.50
c	0.19	0.25
D	8.43	8.76
E	5.80	6.25
E1	3.75	4.00
e	1.27	
L	0.40	0.89
θ	0°	8°

5.3、TSSOP14







2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	—	1.20
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
c	0.09	0.20
D	4.90	5.10
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
L1	1.00	
θ	0°	8°

6、Statements And Notes

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