

芯伯乐®
X I N B O L E

Product Specification

XBLW CD4072

Dual 4-input Or Gate

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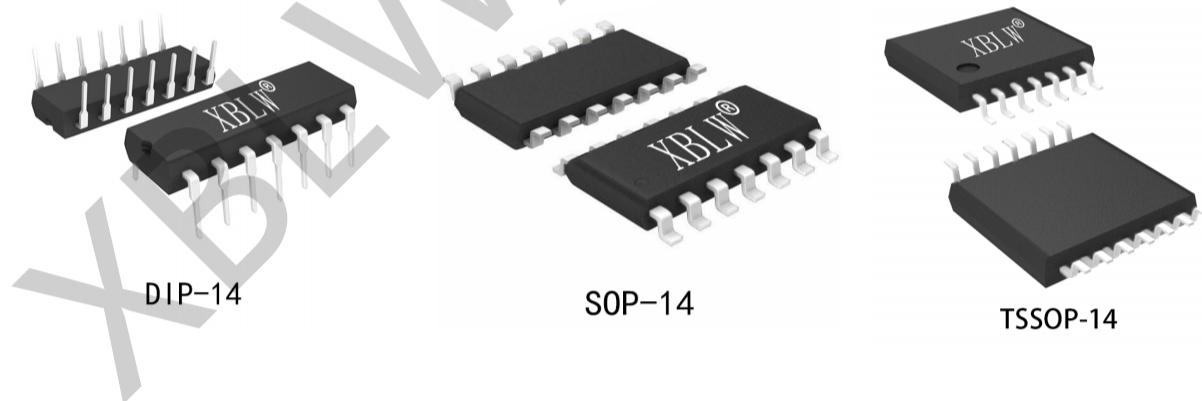
Description

The CD4072 provides the positive dual 4-input OR function. The outputs are fully buffered for highest noise immunity and pattern insensitivity of output impedance.

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

- Wide supply voltage range from 3V to 15V
- 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 $+125^{\circ}\text{C}$
- Packaging information: DIP14/SOP14/TSSOP14



Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW CD4072BE	DIP-14	CD4072BE	Tube	1000Pcs/Box
XBLW CD4072BDTR	SOP-14	CD4072B	Tape	2500Pcs/Reel
XBLW CD4072BTDTR	TSSOP-14	CD4072B	Tape	3000Pcs/Reel

Block Diagram

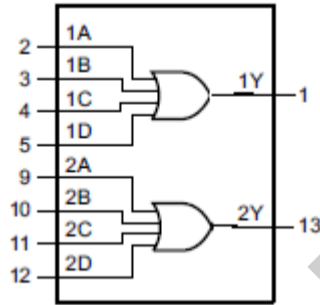


Figure 1. Functional diagram

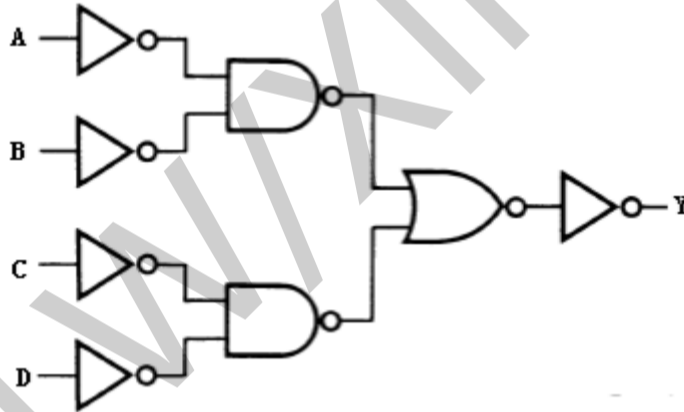
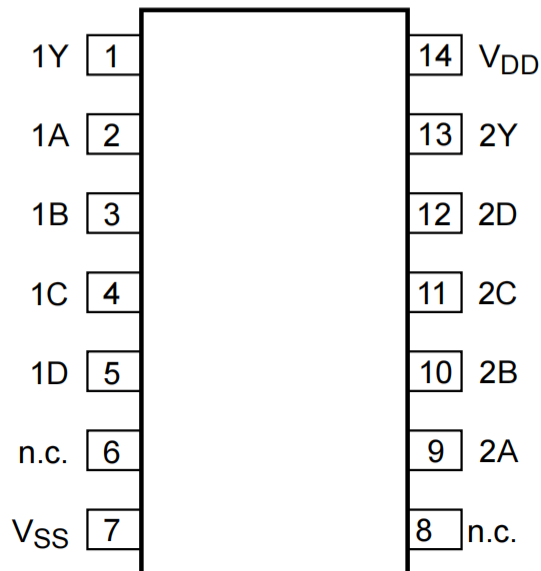


Figure 2. Logic diagram (one gate)

Pin Configurations



Pin Description

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

Function Table

Input				Output
nA	nB	nC	nD	nY
L	L	L	L	L
H	X	X	X	H
X	H	X	X	H
X	X	H	X	H
X	X	X	H	H

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

Electrical Parameter

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}	anyone 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/TSSOP	260	

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	°C

Electrical Characteristics
DC Characteristics 1

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

Parameter	Symbol	Conditions (V)			$T_{amb}=25^{\circ}\text{C}$			Unit
		V_O	V_{IN}	V_{DD}	Min.	Typ.	Max.	
supply current	I_{DD}	-	0, 5	5	-	-	1	uA
		-	0, 10	10	-	-	1	uA
		-	0, 15	15	-	-	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}	0.5, 4.5	-	5	-	-	1.5	V
		1, 9	-	10	-	-	3	V
		1.5, 13.5	-	15	-	-	4	V
HIGH-level input voltage	V_{IH}	4.5	-	5	3.5	-	-	V
		9	-	10	7	-	-	V
		13.5	-	15	11	-	-	V
input leakage current	I_I	-	0, 15	15	-	-	± 1	uA

DC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions (V)			$T_{amb} = -40^{\circ}\text{C}$		$T_{amb} = +85^{\circ}\text{C}$		$T_{amb} = +125^{\circ}\text{C}$		Unit
		V_O	V_{IN}	V_{DD}	Min.	Max.	Min.	Max.	Min.	Max.	
supply current	I_{DD}	-	0, 5	5	-	1	-	7.5	-	7.5	μA
		-	0, 10	10	-	1	-	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}	0.5, 4.5	-	5	-	1.5	-	1.5	-	1.5	V
		1, 9	-	10	-	3	-	3	-	3	V
		1.5, 13.5	-	15	-	4	-	4	-	4	V
HIGH-level input voltage	V_{IH}	4.5	-	5	3.5	-	3.5	-	3.5	-	V
		9	-	10	7	-	7	-	7	-	V
		13.5	-	15	11	-	11	-	11	-	V
input leakage current	I_I	-	0, 15	15	-	± 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

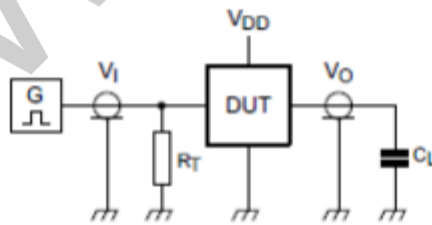


Figure 3. Test circuit for switching times

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

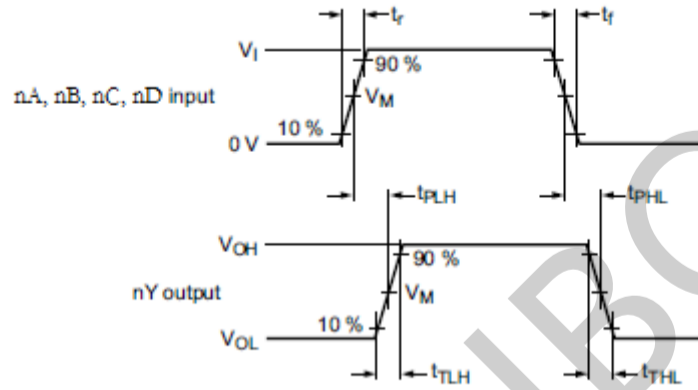


Figure 4. Propagation delay, output transition time

Measurement Points

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

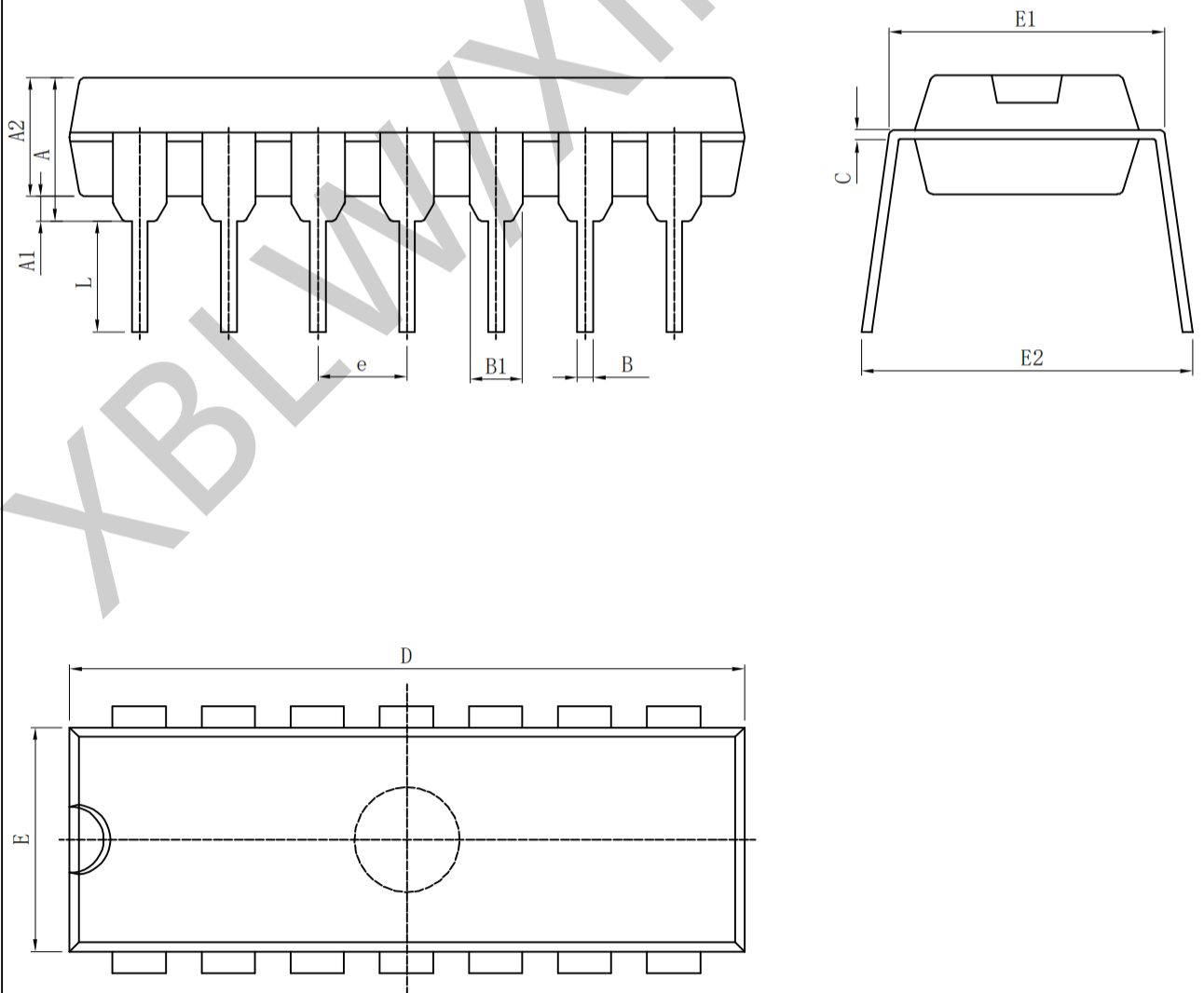
Test Data

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

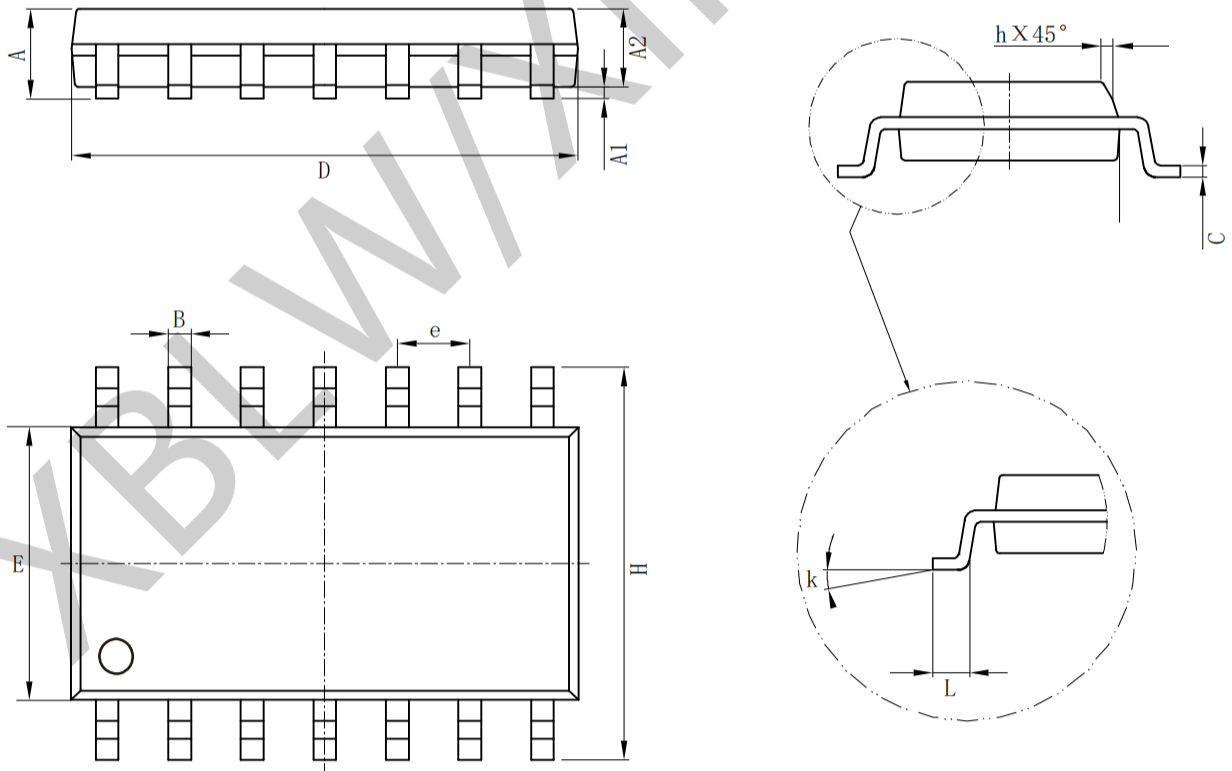
· DIP-14

Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A	3.710	4.310	A	0.146	0.170
A1	0.510		A1	0.020	
A2	3.200	3.600	A2	0.126	0.142
B	0.380	0.570	B	0.015	0.022
B1	1.524 (BSC)		B1	0.060 (BSC)	
C	0.204	0.360	C	0.008	0.014
D	18.800	19.200	D	0.740	0.756
E	6.200	6.600	E	0.244	0.260
E1	7.320	7.920	E1	0.288	0.312
e	2.540 (BSC)		e	0.100 (BSC)	
L	3.000	3.600	L	0.118	0.142
E2	8.400	9.000	E2	0.331	0.354



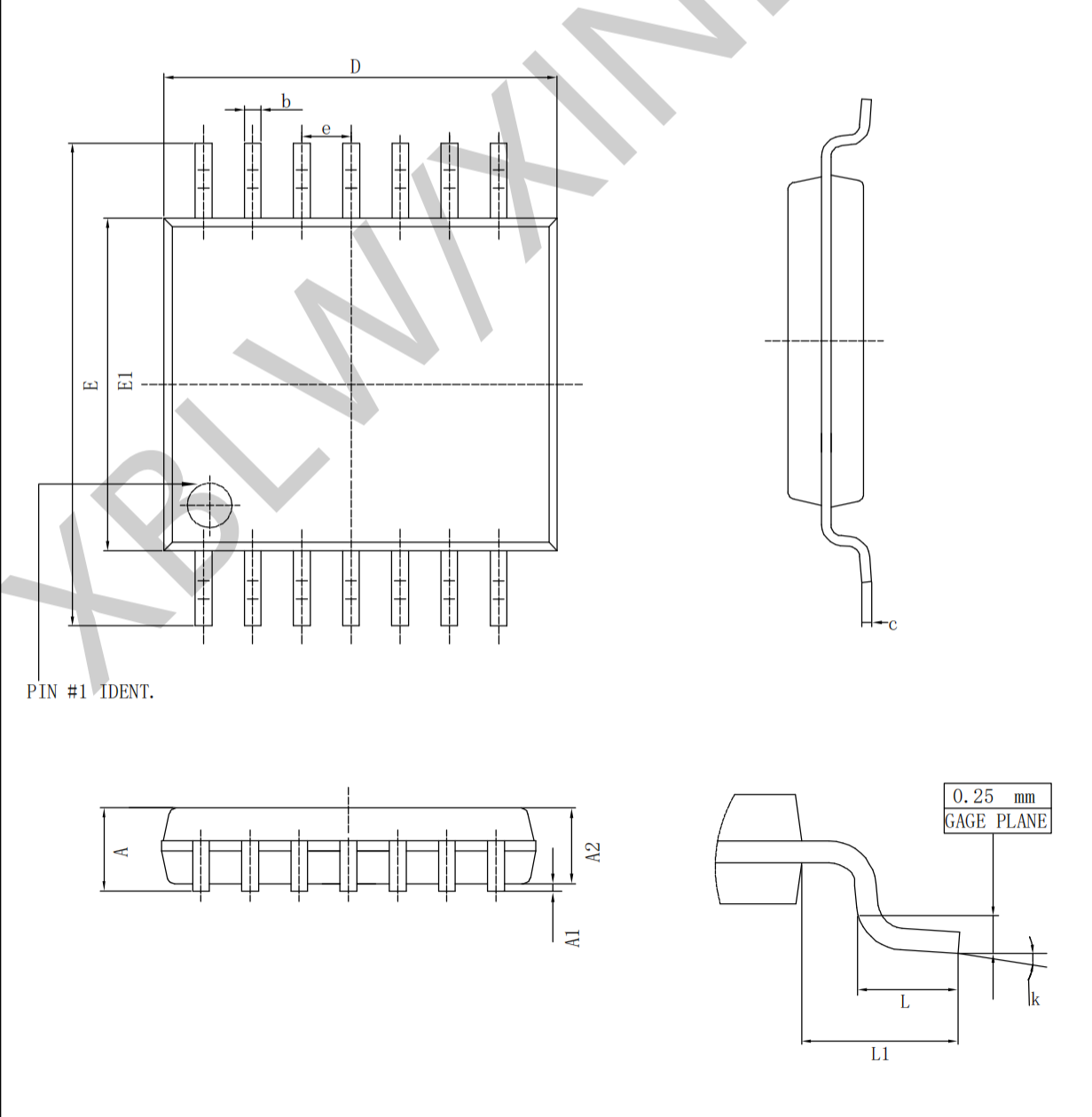
· SOP-14

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	1.350	1.750	A	0.050	0.068
A1	0.100	0.250	A1	0.004	0.009
A2	1.100	1.650	A2	0.040	0.060
B	0.330	0.510	B	0.010	0.020
C	0.190	0.250	C	0.007	0.009
D	8.550	8.750	D	0.330	0.340
E	3.800	4.000	E	0.150	0.150
e	1.27		e	0.05	
H	5.800	6.200	H	0.220	0.240
h	0.250	0.500	h	0.009	0.020
L	0.400	1.270	L	0.015	0.050
k	8° (max)		k	8° (max)	



· TSSOP-14

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A		1.200	A		0.047
A1	0.050	0.150	A1	0.002	0.006
A2	0.800	1.050	A2	0.031	0.041
b	0.190	0.300	b	0.007	0.012
c	0.090	0.200	c	0.004	0.0089
D	4.900	5.100	D	0.193	0.201
E	6.200	6.600	E	0.244	0.260
E1	4.300	4.500	E1	0.169	0.176
e		0.65	e		0.0256
L	0.450	0.750	L	0.018	0.030
L1		1.00	L1		0.039
k		0°	k		0°
		8°			8°



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