

Product Specification

XBLW SN74HC06

Hex Inverter with Open-drain outputs

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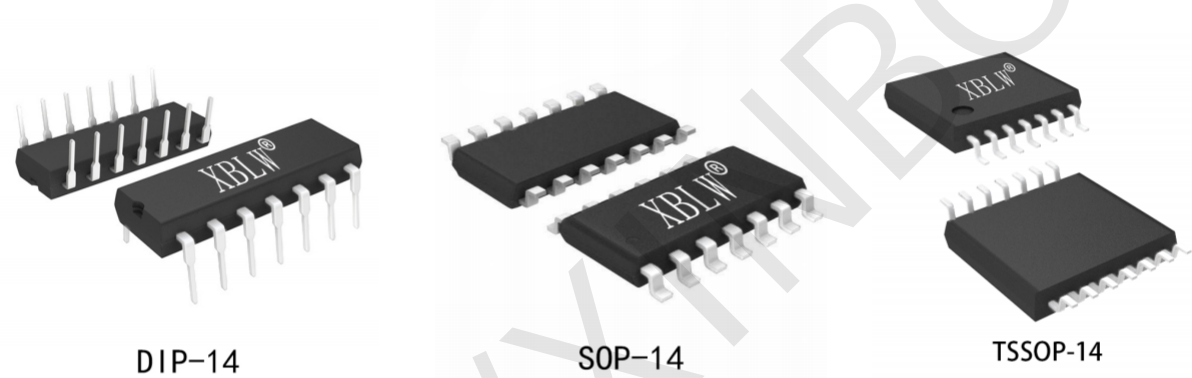


Descriptions

The SN74HC06 contains six inverters. The outputs of the SN74HC06 is open-drain. The open-drain outputs require pull-up resistors to perform correctly.

Features

- Input levels: SN74HC06 CMOS level
- Specified from -40°C to +125°C
- Packaging information: DIP-14/SOP-14/TSSOP-14



Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW SN74HC06N	DIP-14	74HC06N	Tube	1000Pcs/Box
XBLW SN74HC06DTR	SOP-14	74HC06	Tape	2500Pcs/Reel
XBLW SN74HC06TDTR	TSSOP-14	74HC06	Tape	3000Pcs/Reel

Block Diagram

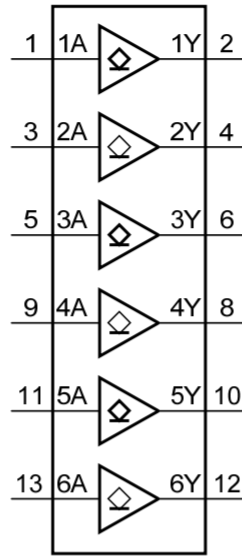


Figure 1. Logic symbol

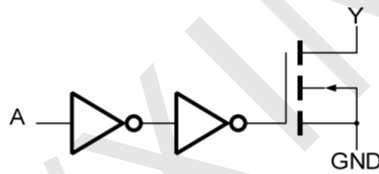
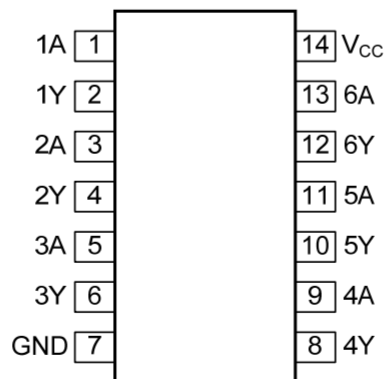


Figure 2. Logic diagram (one gate)

Pin Configurations



Pin Description

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

Function Table

Input	Output
nA	nY
L	Z
H	L

Note: H=HIGH voltage level; L=LOW voltage level; Z=high-impedance OFF-state.

Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V _{CC}	-	-0.5	+7.0	V
output voltage	V _O	-	-0.5	+7.0	V
input clamping current	I _{IK}	V _I <-0.5V or V _I >V _{CC} +0.5V	-	±20	mA
output clamping current	I _{OK}	V _O <-0.5V	-	-20	mA
output current	I _O	-0.5V<V _O	-	-25	mA
supply current	I _{CC}	-	-	+50	mA
ground current	I _{GND}	-	-50	-	mA
storage temperature	T _{stg}	-	-65	+150	°C
total power dissipation	P _{tot}	-	-	500	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_{CC}	-	2.0	5.0	6.0	V
input voltage	V_I	-	0	-	VCC	V
output voltage	V_O	-	0	-	VCC	V
ambient temperature	T_{amb}	-	-40	-	+125	°C

Electrical Characteristics

DC Characteristics 1

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level input voltage	V_{IH}	$V_{CC}=2.0\text{V}$	1.5	1.2	-	V	
		$V_{CC}=4.5\text{V}$	3.15	2.4	-	V	
		$V_{CC}=6.0\text{V}$	4.2	3.2	-	V	
LOW-level input voltage	V_{IL}	$V_{CC}=2.0\text{V}$	-	0.8	0.5	V	
		$V_{CC}=4.5\text{V}$	-	2.1	1.35	V	
		$V_{CC}=6.0\text{V}$	-	2.8	1.8	V	
LOW-level output voltage	V_{OL}	$V_I = V_{IH}$ or V_{IL}	$I_O = 20\mu\text{A}; V_{CC} = 2.0\text{V}$	-	0	0.1	V
			$I_O = 20\mu\text{A}; V_{CC} = 4.5\text{V}$	-	0	0.1	V
			$I_O = 20\mu\text{A}; V_{CC} = 6.0\text{V}$	-	0	0.1	V
			$I_O = 4.0\text{mA}; V_{CC} = 4.5\text{V}$	-	0.15	0.33	V
			$I_O = 5.2\text{mA}; V_{CC} = 6.0\text{V}$	-	0.16	0.33	V
input leakage current	I_I	$V_I = V_{CC}$ or GND; $V_{CC} = 6.0\text{V}$	-	-	± 2	μA	
OFF-state output current	I_{OZ}	per input pin; $V_I = V_{IL}$; $V_O = V_{CC}$ or GND; other inputs at V_{CC} or GND; $V_{CC} = 6.0\text{V}$; $I_O = 0\text{A}$	-	-	± 2	μA	
supply current	I_{CC}	$V_I = V_{CC}$ or GND; $I_O = 0\text{A}$; $V_{CC} = 6.0\text{V}$	-	-	2	μA	
additional supply current	ΔI_{CC}	per input pin; $V_I = V_{CC} - 2.1\text{V}$; other inputs at V_{CC} or GND; $I_O = 0\text{A}$; $V_{CC} = 4.5\text{V}$ to 5.5V	-	100	450	μA	

DC Characteristics 2

(Tamb=-40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V	1.5	-	-	V	
		V _{CC} =4.5V	3.15	-	-	V	
		V _{CC} =6.0V	4.2	-	-	V	
LOW-level input voltage	V _{IL}	V _{CC} =2.0V	-	-	0.5	V	
		V _{CC} =4.5V	-	-	1.35	V	
		V _{CC} =6.0V	-	-	1.8	V	
LOW-level output voltage	V _{OL}	V _I =V _{IH} or V _{IL}	I _O =20uA; V _{CC} =2.0V	-	-	0.1	V
			I _O =20uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =20uA; V _{CC} =6.0V	-	-	0.1	V
			I _O =4.0mA; V _{CC} =4.5V	-	-	0.4	V
			I _O =5.2mA; V _{CC} =6.0V	-	-	0.4	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =6.0V	-	-	±4	uA	
OFF-state output current	I _{OZ}	per input pin; V _I =V _{IL} ; V _O =V _{CC} or GND; other inputs at V _{CC} or GND; V _{CC} =6.0V; I _O =0A	-	-	±4	uA	
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =6.0V	-	-	4	uA	
additional supply current	ΔI _{CC}	per input pin; V _I =V _{CC} -2.1V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =4.5V to 5.5V	-	-	490	uA	

AC Characteristics 1

(Tamb=-40°C to +85°C, GND=0V, CL=50pF, unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
nA to nY propagation delay	t _{pd}	see Figure 4 ^[1]	V _{CC} =2.0V	-	28	120	ns
			V _{CC} =4.5V	-	10	24	ns
			V _{CC} =5.0V; C _L =15pF	-	8	-	ns
			V _{CC} =6.0V	-	8	20	ns
transition time	t _t	see Figure 4 ^[2]	V _{CC} =2.0V	-	19	95	ns
			V _{CC} =4.5V	-	7	19	ns
			V _{CC} =6.0V	-	6	16	ns

Note:

[1] t_{pd} is the same as t_{PLZ} and t_{PZL}.

[2] t_t is the same as t_{THL}.

AC Characteristics 2

(Tamb=-40°C to +125°C, GND=0V, CL=50pF, unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
nA to nY propagation delay	t _{pd}	see Figure 4 ^[1]	V _{CC} =2.0V	-	-	145	ns
			V _{CC} =4.5V	-	-	29	ns
			V _{CC} =6.0V	-	-	25	ns
transition time	t _t	see Figure 4 ^[2]	V _{CC} =2.0V	-	-	110	ns
			V _{CC} =4.5V	-	-	22	ns
			V _{CC} =6.0V	-	-	19	ns

Note:

[1] t_{pd} is the same as t_{PLZ} and t_{PZL}.

[2] t_t is the same as t_{THL}.

Testing Circuit

AC Testing Circuit

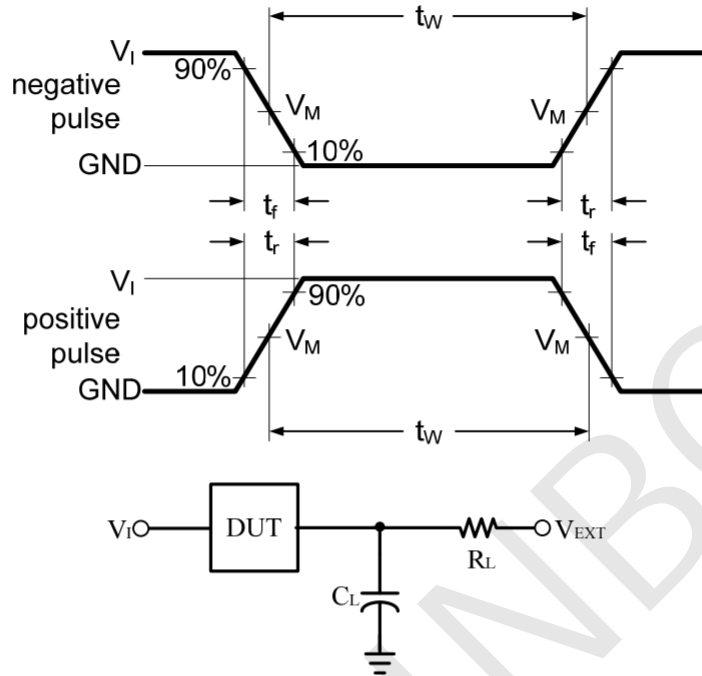


Figure 3. Test circuit for measuring switching times

C_L includes probe and jig capacitance.

AC Testing Waveforms

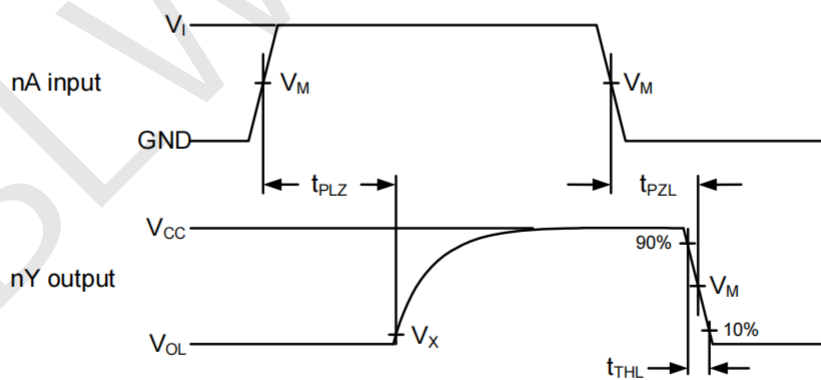


Figure 4. The input nA to output nY propagation delays and output transition times

Measurement Points

Type	Input	Output	
	V_M	V_M	V_X
SN74HC06	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$0.1 \times V_{CC}$

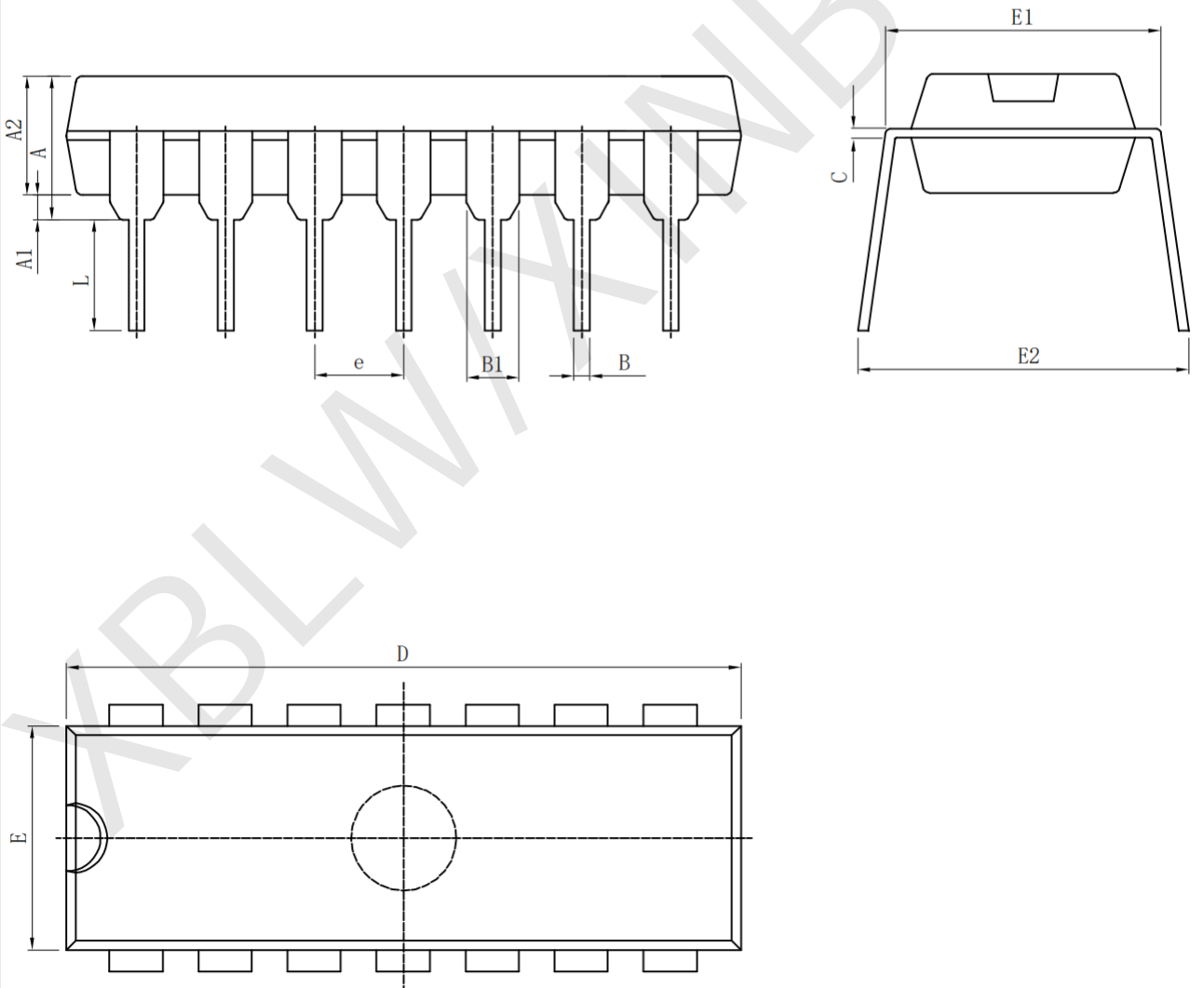
Test Data

Type	Input		Load		S1 position
	V_I	t_r, t_f	C_L	R_L	t_{PZL}, t_{PLZ}
SN74HC06	V_{CC}	6ns	15pF, 50pF	1k Ω	V_{CC}

Package Information

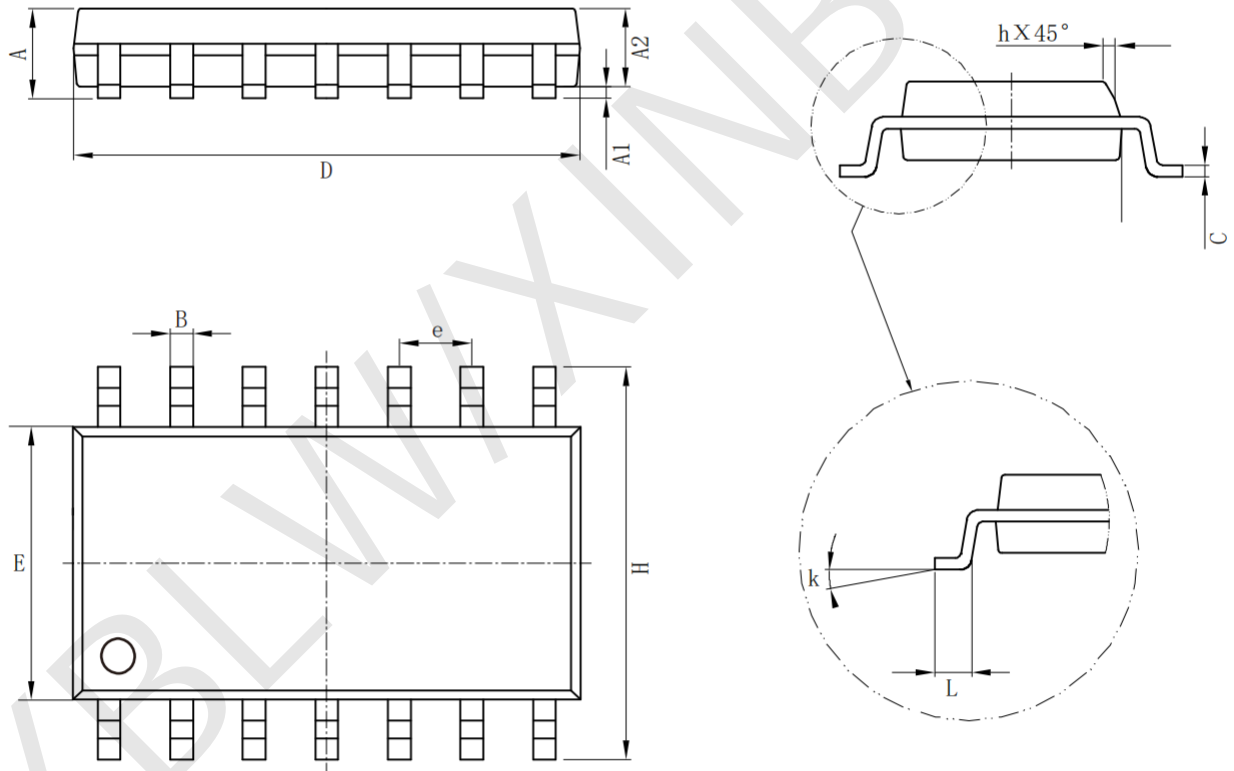
· DIP-14

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



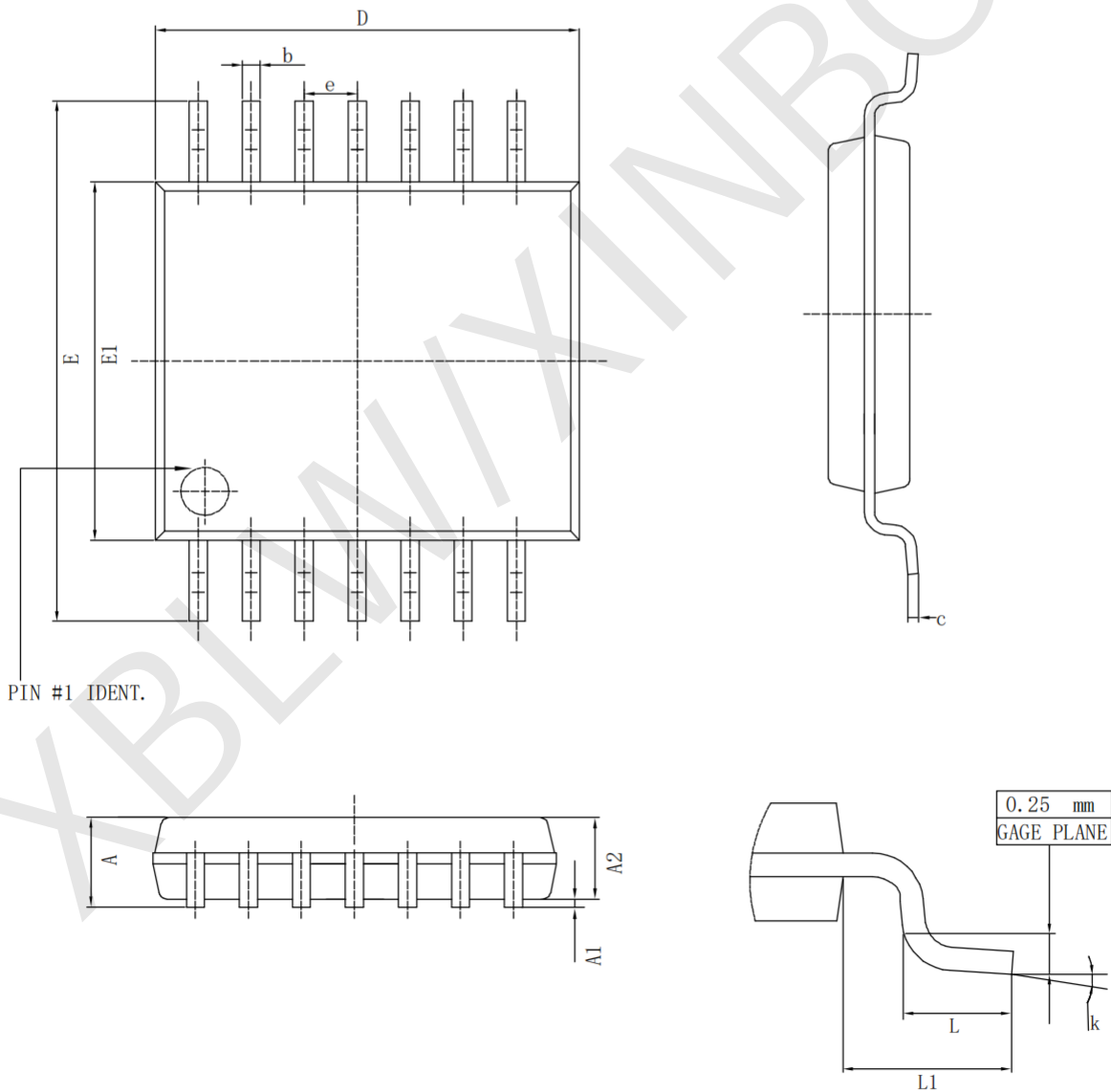
· SOP-14

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°	8°	k	0°	8°



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