芯伯乐®
XINBOLE

Product Specification

XBLW SN74AHC1G04

Single Inverter

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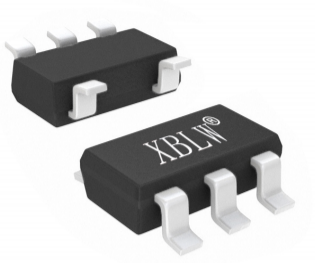
Description

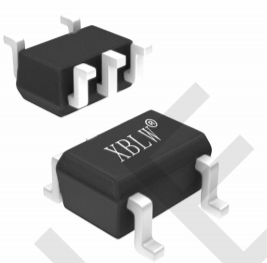
The SN74AHC1G04 is a high-speed Si-gate CMOS devices. Provide a inverting buffer.

Feature

- Specified from -40°C to +125°C
- Packaging information: SOT-23-5/SOT-353
- Low power consumption
- Operating range 2 V to 5.5 V



SOT23-5



SOT-353

Applications

- Cameras
- E-Meters
- Infotainment
- Ethernet Switches

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW SN74AHC1G04T235	SOT-23-5	CBXX	Tape	3000Pcs/Reel
XBLW SN74AHC1G04T353	SOT-353	CBXX	Tape	3000Pcs/Reel

Block Diagram

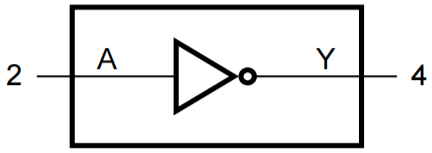


Figure 1. Logic symbol

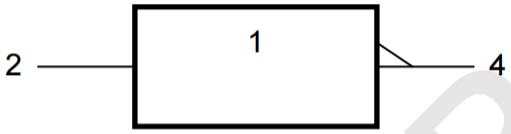
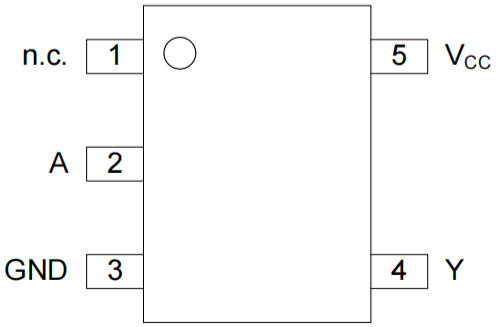


Figure 2.ICE Logic symbol

Figure 3.ICE Logic diagram

Pin Configurations



Pin Description

Pin No.	Pin Name	Description
1	n.c.	not connected
2	A	data input
3	GND	ground (0V)
4	Y	data output
5	Vcc	supply voltage

Function Table

Input	Output
A	**Y**
L	H
H	L

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

Electrical Parameter

Absolute Maximum Ratings

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

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+7.0	V
input voltage	V_I	-	-0.5	+7.0	V
input clamping current	I_{IK}	V_I < -0.5V	-20	-	mA
output clamping current	I_{OK}	V_O< -0.5V or V_O>V_{CC}+0.5V	-	±20	mA
output current	I_O	-0.5V < V_O<V_{CC}+0.5V	-	±25	mA
supply current	I_{CC}	-	-	75	mA
ground current	I_{GND}	-	-75	-	mA
storage temperature	T_{stg}	-	-65	+150	℃
total power dissipation	P_{tot}		-	250	mW
Soldering temperature	T_L	10s	260		℃

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	2.0	5.0	5.5	V
input voltage	V_I	-	0	-	5.5	V
output voltage	V_O	-	0	-	Vcc	V
ambient temperature	T_{amb}	-	-40	-	+125	℃
input transition rise and fall rate	$\Delta t/\Delta V$	Vcc=3.0V to 3.6V	-	-	100	ns/V
		Vcc=4.5V to 5.5V	-	-	20	ns/V

ESD Ratings

Parameter		Defintion	Vaue	Unit
$V_{(ESD)}$	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins (1)	±2000	V
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins (2)	±1000	

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Electrical Characteristics

DC Characteristics 1

(T_{amb}=25℃, voltages are referenced to GND (ground=oV), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	Vcc=2.0V		1.5		-	V
		Vcc=3.0V		2.1		-	V
		Vcc=5.5V		3.85		-	V
LOW-level input voltage	V_{IL}	Vcc=2.0V		-		0.5	V
		Vcc=3.0V		-		0.9	V
		Vcc=5.5V		-		1.65	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	Io=-50uA; Vcc=2.0V	1.9	2.0		V
			Io=-50uA; Vcc=3.0V	2.9	3.0		V
			Io=-50uA; Vcc=4.5V	4.4	4.5		V
			Io=-4mA; Vcc=3.0V	2.58	-		V
			Io=-8mA; Vcc=4.5V	3.94	-		V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	Io=50uA; Vcc=2.0V		0	0.1	V
			Io=50uA; Vcc=3.0V		0	0.1	V
			Io=50uA; Vcc=4.5V		0	0.1	V
			Io=4mA; Vcc=3.0V		-	0.36	V
			Io=8mA; Vcc=4.5V		-	0.36	V
input leakage current	I_I	V_I=5.5V or GND; Vcc=0V to 5.5V		-	-	1.0	uA
supply current	I_{CC}	Vi=Vcc or GND; Io=0A; Vcc= 5.5V		-	-	1.0	uA
input capacitance	C_I	-		-	1.5	10	pF

DC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	Vcc=2.0V		1.5		-	V
		Vcc=3.0V		2.1		-	V
		Vcc=5.5V		3.85		-	V
LOW-level input voltage	V_{IL}	Vcc=2.0V		-		0.5	V
		Vcc=3.0V		-		0.9	V
		Vcc=5.5V		-		1.65	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	Io=-50UA; Vcc=2.0V	1.9			V
			Io=-50UA; Vcc=3.0V	2.9			V
			Io=-50UA; Vcc=4.5V	4.4			V
			Io=-4mA; Vcc=3.0V	2.48			V
			Io=-8mA; Vcc=4.5V	3.8			V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	Io=50UA; Vcc=2.0V			0.1	V
			Io=50UA; Vcc=3.0V			0.1	V
			Io=50UA; Vcc=4.5V			0.1	V
			Io=4mA; Vcc=3.0V			0.44	V
			Io=8mA; Vcc=4.5V			0.44	V
input leakage current	I_I	V_I=5.5V or GND; Vcc=0V to 5.5V		-	-	1.0	uA
supply current	I_{CC}	V_I=Vcc or GND; Io=0A; Vcc= 5.5V		-	-	10	uA
input capacitance	C_I			-	-	10	pF

DC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	Vcc=2.0V		1.5		-	V
		Vcc=3.0V		2.1		-	V
		Vcc=5.5V		3.85		-	V
LOW-level input voltage	V_{IL}	Vcc=2.0V		-		0.5	V
		Vcc=3.0V		-		0.9	V
		Vcc=5.5V		-		1.65	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	Io=-50uA; Vcc=2.0V	1.9			V
			Io=-50uA; Vcc=3.0V	2.9			V
			Io=-50uA; Vcc=4.5V	4.4			V
			Io=-4mA; Vcc=3.0V	2.4			V
			Io=-8mA; Vcc=4.5V	3.7			V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	Io=50uA; Vcc=2.0V			0.1	V
			Io=50uA; Vcc=3.0V			0.1	V
			Io=50uA; Vcc=4.5V			0.1	V
			Io=4mA; Vcc=3.0V			0.55	V
			Io=8mA; Vcc=4.5V			0.55	V
input leakage current	I_I	V_I=5.5V or GND; Vcc=0V to 5.5V		-	-	2.0	uA
supply current	I_{CC}	Vi=Vcc or GND; Io=0A; Vcc= 5.5V		-	-	40	uA
input capacitance	C_I			-	-	10	pF

AC Characteristics 1

(T_{amb}=25℃,voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
A to Y propagation delay	t_{pd}	see Figure 5	V_{CC}=3.0V to 3.6V				
			G=15pF	-	4.3	7.1	ns
			C_L=50pF	-	6.1	10.6	ns
			V_{CC}=4.5V to 5.5V				
			G=15pF	-	3.1	5.5	ns
			C_L=50pF	-	4.5	7.5	ns
Power dissipation capacitance	C_{PD}	C_L=50pF； f_i=1MHz； V_I=GND～V_{CC}		-	15	-	pF

Note:

[1]tpd is the same as t_{PHL} and t_{PLH}.

[2]Typical values are measured at Vcc=3.3V or 5V.

[3]C_{PD} is used to determine the dynamic power dissipation (P_D in uW).

$P_D=C_{PD}\times V_{CC}^2\times f_i+\sum(C_L\times V_{CC}^2\times f_o)$where:

f_i=input frequency in MHz;

f_o=output frequency in MHz;

C_L=output loadcapacitance in pF;

Vcc=supply voltage in V;

$\sum(C_L\times V_{CC}^2\times f_o)$=sum of outputs.

AC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
A to Y propagation delay	t_{pd}	see Figure 5	Vcc=3.0V to 3.6V				
			G=15pF	1.0	-	8.5	ns
			C_L=50PF	1.0	-	12	ns
			Vcc=4.5V to 5.5V				
			C_L=15PF	1.0	-	6.5	ns
			C_L=50PF	1.0	-	8.5	ns

Note:

[1] tpd is the same as tPHL and tPLH.

[2] Typical values are measured at Vcc=3.3V or 5V.

AC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
A to Y propagation delay	t_{pd}	see Figure 5	Vcc=3.0V to 3.6V				
			C_L=15PF	1.0	-	11	ns
			C_L=50PF	1.0	-	14.5	ns
			Vcc=4.5V to 5.5V				
			C_L=15PF	1.0	-	7.0	ns
			C_L=50PF	1.0	-	9.5	ns

Note:

[1] tpd is the same as tPHL and tPLH.

[2] Typical values are measured at Vcc=3.3V or 5V.

Testing Circuit

AC Testing Circuit

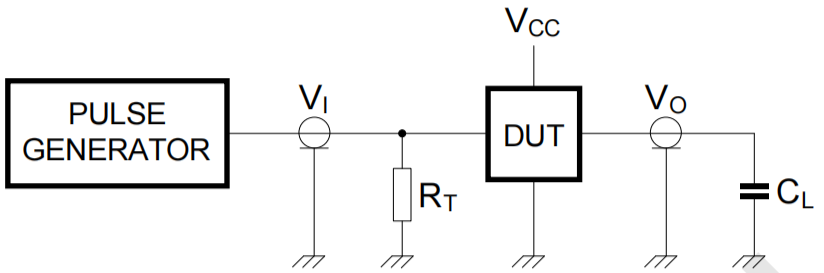


Figure 4. Load circuitry for switching times

Definitions for test circuit:
C_L=Load capacitance including jig and probe capacitance.
R_T=Termination resistance should be equal to output impedance Zo of the pulse generator.

AC Testing Waveforms

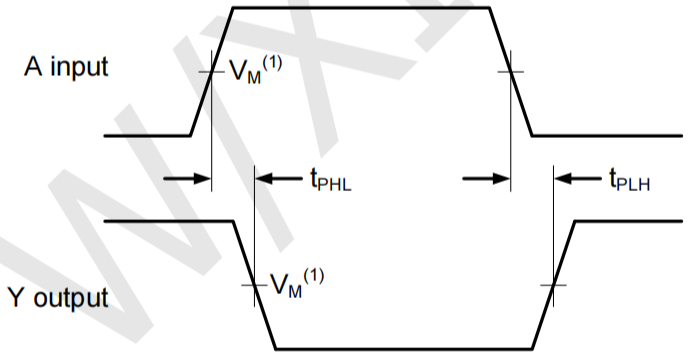


Figure 5. The input (A) to output (Y) propagation delay times

Measurement Points

Type	Input		Output
	V_I	V_M	V_M
SN74AHC1G04	GND to Vcc	0.5xVcc	0.5xVcc

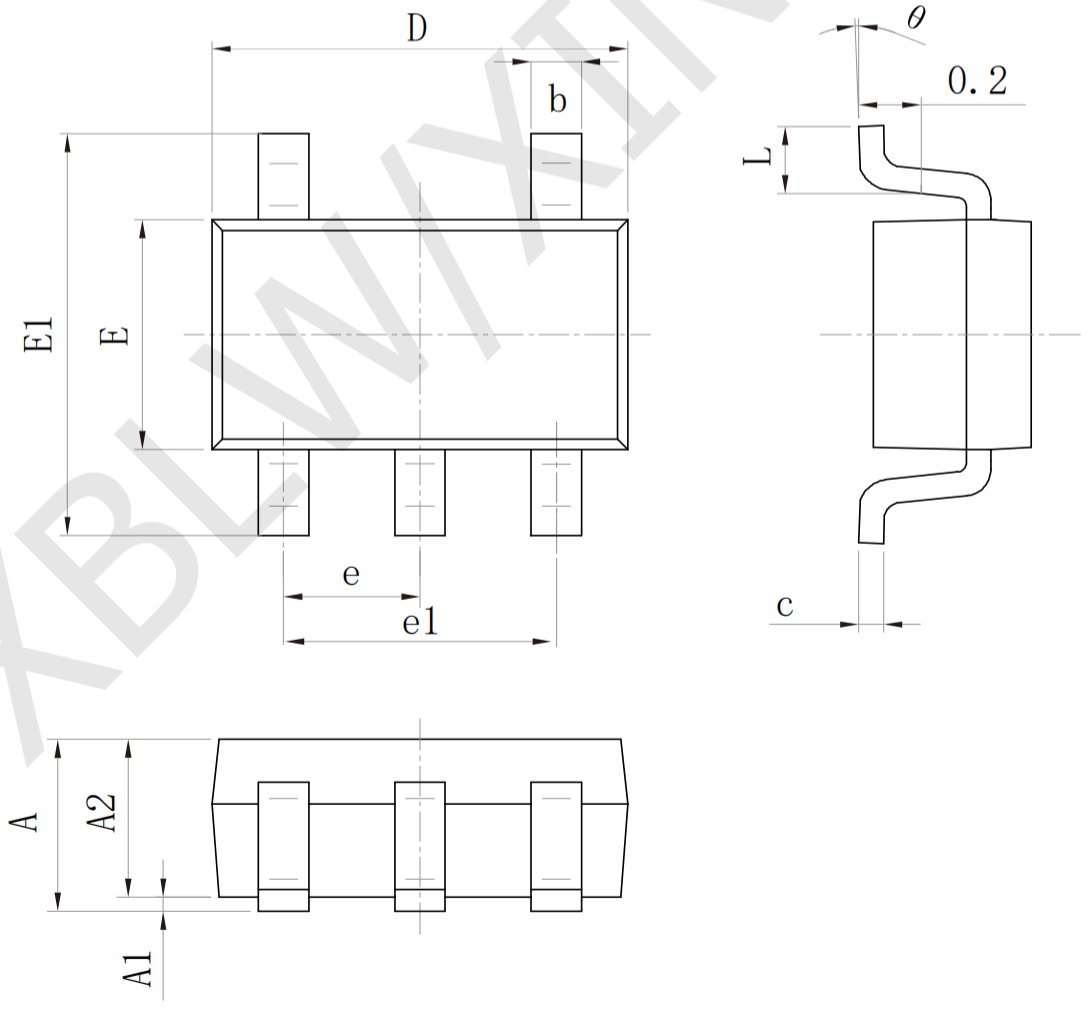
Test Data

Input		Load
V_I	t_r, t_f	C_L
GND to Vcc	< 3.0ns	15pF
GND to Vcc	< 3.0ns	50pF

Package Information

- SOT23-5

SIZE / SYMBOL	Dimensions In Millimeters		SIZE / SYMBOL	Dimensions In Inches	
	MIN(mm)	MAX(mm)		MIN(in)	MAX(in)
A	1.050	1.250	A	0.041	0.049
A1	0.000	0.100	A1	0.000	0.004
A2	1.050	1.150	A2	0.041	0.045
b	0.300	0.500	b	0.012	0.020
c	0.100	0.200	c	0.004	0.008
D	2.820	3.020	D	0.111	0.119
E	1.500	1.700	E	0.059	0.067
E1	2.650	2.950	E1	0.104	0.116
e	0.95(BSC)		e	0.037(BSC)	
e1	1.800	2.000	e1	0.071	0.079
L	0.300	0.600	L	0.012	0.024
θ	0°	8°	θ	0°	8°



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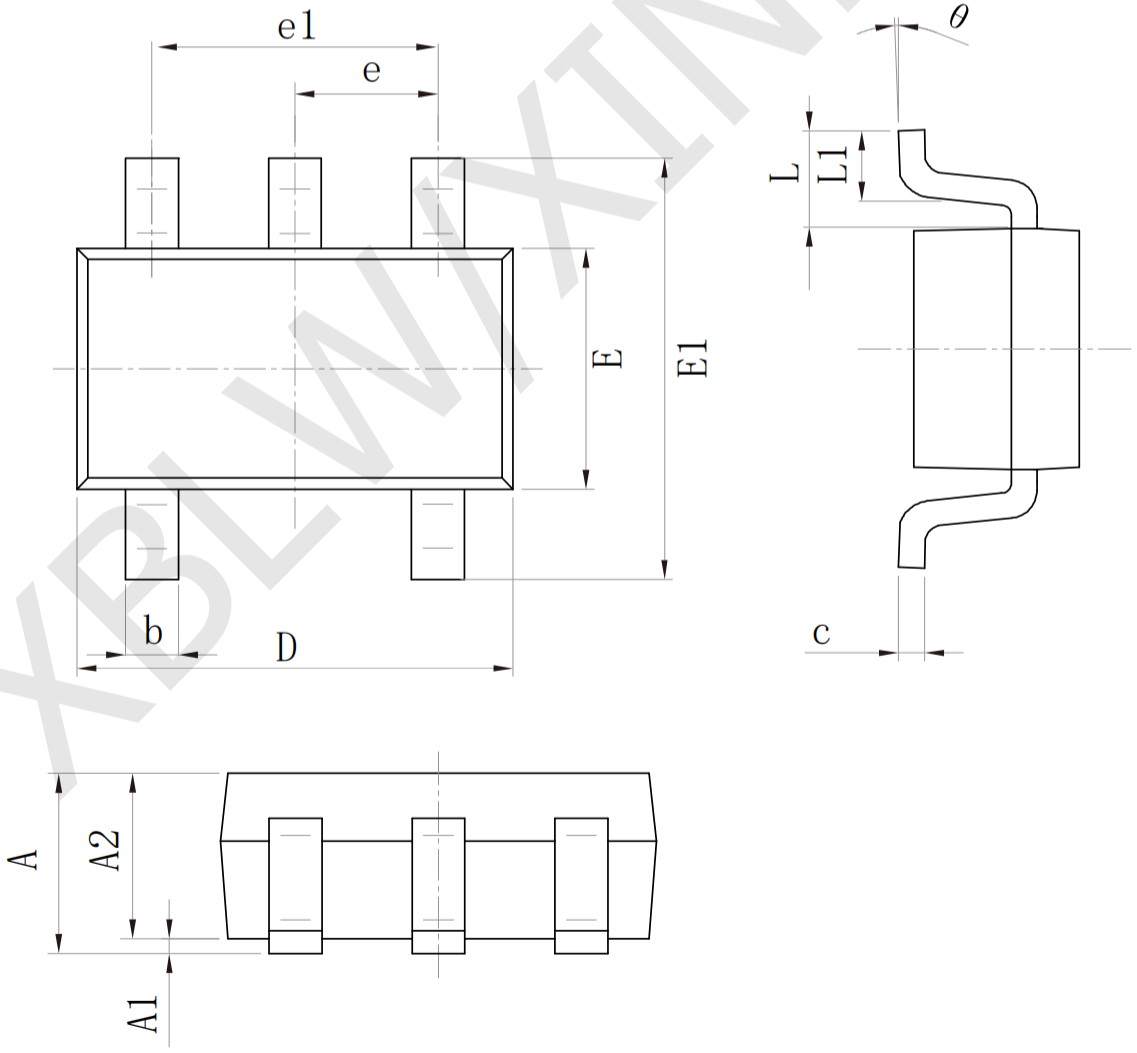
Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	0.900	1.100	A	0.035	0.043
A1	0.000	0.100	A1	0.000	0.004
A2	0.900	1.000	A2	0.035	0.039
b	0.150	0.350	b	0.006	0.014
c	0.080	0.150	C	0.003	0.006
D	2.000	2.200	D	0.079	0.087
E	1.150	1.350	E	0.045	0.053
E1	2.150	2.450	E1	0.085	0.096
e	0.650(TYP)		e	0.026(TYP)	
e1	1.200	1.400	e1	0.047	0.055
L	0.525(REF)		L	0.021(REF)	
L1	0.260	0.460	L1	0.010	0.018
θ	0°	8°	θ	0°	8°



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