General Description

The SN74AHCT1G08 device is a single 2-input positive-AND gate. The device performs the Boolean function $Y = A \cdot B$ or $Y = \overline{A + B}$ in positive logic. Low I_{CC} current allows this device to be used in power-sensitive or battery-powered applications.

Features

- Operating Range: 4.5 V to 5.5 V
- Maximum tpd of 7.1 ns at 5 V
- Low Power Consumption: Maximum I_{CC} of 10 μA
- ±8 mA Output Drive at 5 V
- Inputs are TTL-Voltage Compatible
- Packages are SC70-5,SOT23-5 or small DFN6
- MSL3(SC70-5,SOT23-5，DFN6(1*1.5)

Pin Configuration
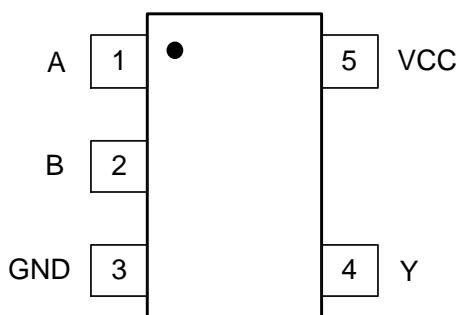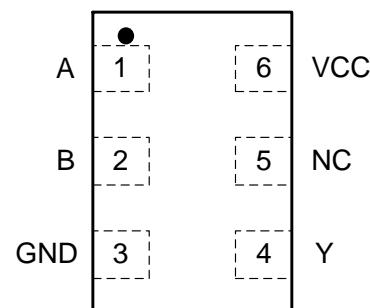
SOT23-5/SC70-5   DFN6（1*1.5）

Figure1. Top View

Pin Function

SC70-5/ SOT23-5

Pin No.	Pin Name	Function
1	A	Input A
2	B	Input B
3	GND	Ground
4	Y	Output
5	VCC	Supply Voltage

DFN6

Pin No.	Pin Name	Function
1	A	Input A
2	B	Input B
3	GND	Ground
4	Y	Output
5	NC	No connect
6	VCC	Supply Voltage

Block Diagram
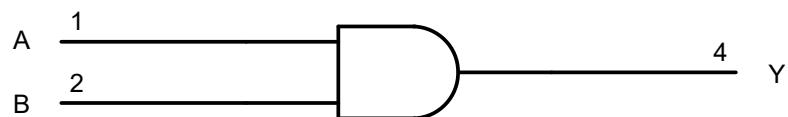
Figure2. Logic Symbol

Functional Description

Function Table

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

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage	−0.5 to 7.0	V
V_I	DC Input Voltage [1]	$-0.5 \leq V_I \leq +7.0$	V
V_O	DC Output Voltage Output in Higher or Low State	-0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current $V_I < GND$	−20	mA
I_{OK}	DC Output Diode Current $V_O < GND$, $V_O > V_{CC}$	±20	mA
I_O	DC Output Sink Current	±25	mA
I_{CC}	DC Supply Current per Supply Pin	±50	mA
I_{GND}	DC Ground Current per Supply Pin	±50	mA
T_{STG}	Storage Temperature Range	−65 to 150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds	260	°C
T_J	Junction Temperature Under Bias	150	°C
V_{ESD}	ESD Classification	Human Body Model [2]	±4000	V
		Charged Device Model [3]	±1000	
I_{LU}	Latch-up Current Above V_{CC} and GND at 125°C [4]	±100	mA

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
$R_{\theta JA}$	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	300	°C/W
	SOT23-5		250	
	DFN6(1.0×1.5)		440	
$R_{\theta JB}$	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-board	75	°C/W
	SOT23-5		65	
	DFN6(1.0×1.5)		270	
P_D	SC70-5	Power Dissipation in Still Air at 85°C	215	mW
	SOT23-5		260	
	DFN6(1.0×1.5)		150	

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V$_{CC}$	Supply Voltage	4.5	5.5	V
V$_{IH}$	High-level Input Voltage	2		V
V$_{IL}$	Low-level Input Voltage		0.8	V
V$_I$	Input Voltage	0	5.5	V
V$_O$	Output Voltage	0	V$_{CC}$	V
I$_{OH}$	High-level Output Current		-8	mA
I$_{OL}$	Low-level Output Current		8	mA
Δt/Δv	Input Transition Rise and Fall Rate		20	ns/V
T$_A$	Operating Temperature Range	-40	125	°C

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied.

Electrical Characteristics

DC Electrical Characteristics

Symbol	Parameter	Condition	V$_{CC}$(V)	T$_A$=25°C			−40°C≤T$_A$≤125°C		Unit
				Min	Typ	Max	Min	Max	
V$_{OH}$	High−Level Output Voltage	I$_{OH}$=−50μA	4.5	4.4	4.5		4.4		V
		I$_{OH}$=−8mA	4.5	3.94			3.8		
V$_{OL}$	Low−Level Output Voltage	I$_{OL}$=50μA	4.5			0.1		0.1	V
		I$_{OL}$=8mA	4.5			0.36		0.44	
I$_I$	Input Current	V$_{IN}$ = 5.5V or GND	0 to 5.5			±0.1		±1	μA
I$_{CC}$	Supply Current	V$_{IN}$ = V$_{CC}$ or GND, I$_O$ = 0	5.5			1.0		10	μA
ΔI$_{CC}$ [5]	Change in Supply Current	One input at 3.4 V, Other Inputs at V$_{CC}$ or GND	5.5			1.35		1.5	mA
C$_I$	Input Capacitance	V$_{IN}$ = V$_{CC}$ or GND	5		3	10			pF

Note5: This is the increase in supply current for each input at one of the specified TTL voltage levels, rather than 0 V or V$_{CC}$.

Switching Characteristics

Over recommended operating free-air temperature range, V_{CC} = 5V±0.5V (unless otherwise noted)

(see Figure 3)

Symbol	Parameter	Condition	T_A=25°C			−40°C≤T_A≤85°C		−40°C≤T_A≤125°C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
t_{PLH}	Propagation Delay	C_L= 15pF		2.5	6.2	1	7.1	1	7.5	ns
t_{PHL}		C_L= 15pF		4.5	6.8	1	7.1	1	7.5	ns
t_{PLH}		C_L= 50pF		3.0	7.9	1	9	1	10	ns
t_{PHL}		C_L= 50pF		5.5	8.3	1	9	1	10	ns

Operating Characteristics

V_{CC} = 5 V, T_A = 25°C

Symbol	Parameter	Condition	Typ	Unit
C_{PD}	Power Dissipation Capacitance [6]	No load, f = 1 MHz	12	pF

Note6: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: $I_{CC(OPR)}=C_{PD}\times V_{CC}\times f_{in}+I_{CC}\times C_{PD}$ is used to determine the no−load dynamic power consumption; $P_D=C_{PD}\times V_{CC}^2 \times f_{in}+I_{CC}\times V_{CC}\times$Fig.

Waveform and Test Circuit

C_L includes probe and jig capacitance

All input pulses are supplied by generators having the following characteristics:PRR ≤ 1MHz, Z_O=50Ω, t_r ≤ 3ns,t_f ≤ 3 ns.

The outputs are measured one at a time with one input transition per measurement.

All parameters and waveforms are not applicable to all devices.

Figure3. Load Circuit and Voltage Waveforms
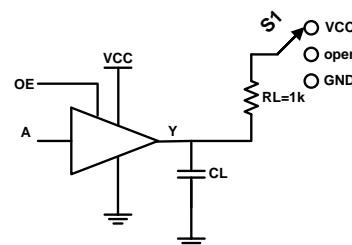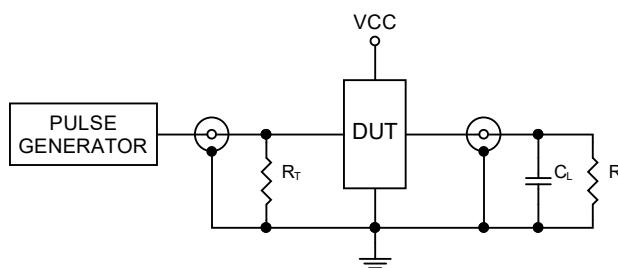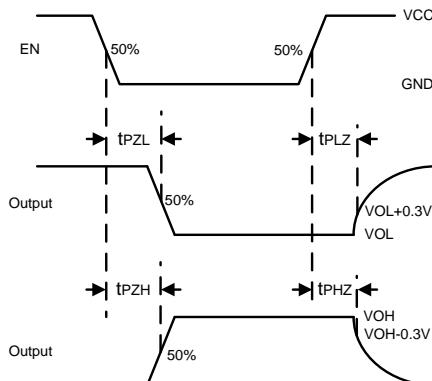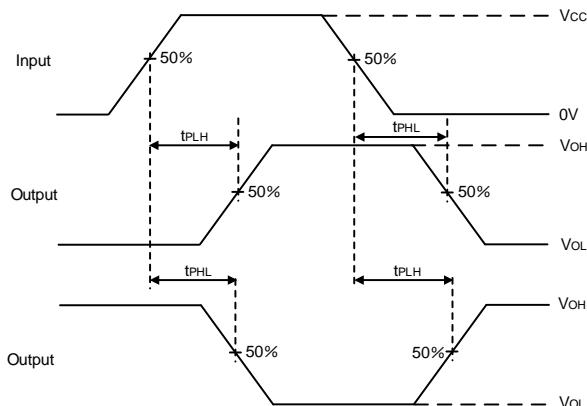
Test	Swith
tPD	Open
tPZL tPLZ	VCC
tPZH tPHZ	GND

Package Dimension

SC70-5

SOT23-5

DFN6(1×1.5)

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Orderinginformation

Order code	Marking code	Package	Baseqty	Deliverymode
UMW SN74AHCT1G08DBVR	B08S U	SOT23-5	3000	Tape and reel
UMW SN74AHCT1G08DCKR	BEG U	SC70-5	3000	Tape and reel
UMW SN74AHCT1G08DRYR	——	DFN6（1*1.5）	5000	Tape and reel

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