

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 μ A
- ± 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

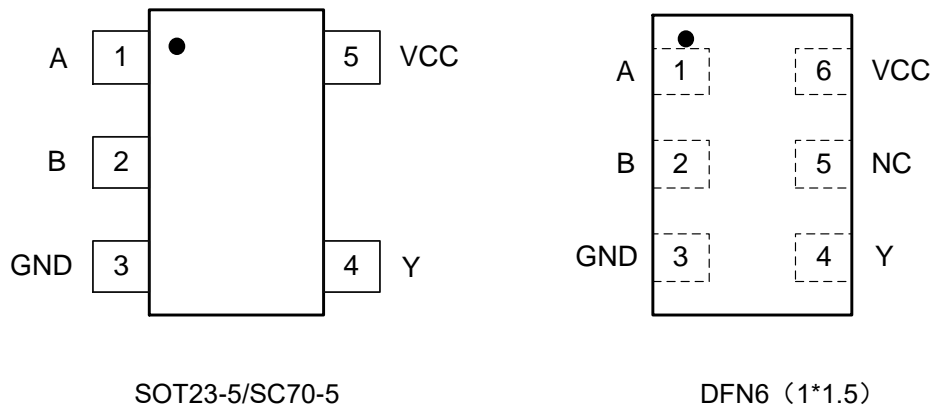


Figure1. Top View

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

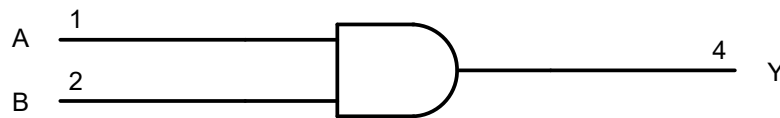


Figure2. Logic Symbol

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 ≤ V _I ≤ +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 _{θJA}	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	300	°C/W
	SOT23-5		250	
	DFN6(1.0×1.5)		440	
R _{θJB}	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, $V_{CC} = 5V \pm 0.5V$ (unless otherwise noted)
(see Figure 3)

Symbol	Parameter	Condition	$T_A = 25^\circ\text{C}$			$-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$		Unit
			Min	Typ	Max	Min	Max	Min	Max	
t_{PLH}	Propagation Delay	$C_L = 15\text{pF}$		2.5	6.2	1	7.1	1	7.5	ns
t_{PHL}		$C_L = 15\text{pF}$		4.5	6.8	1	7.1	1	7.5	ns
t_{PLH}		$C_L = 50\text{pF}$		3.0	7.9	1	9	1	10	ns
t_{PHL}		$C_L = 50\text{pF}$		5.5	8.3	1	9	1	10	ns

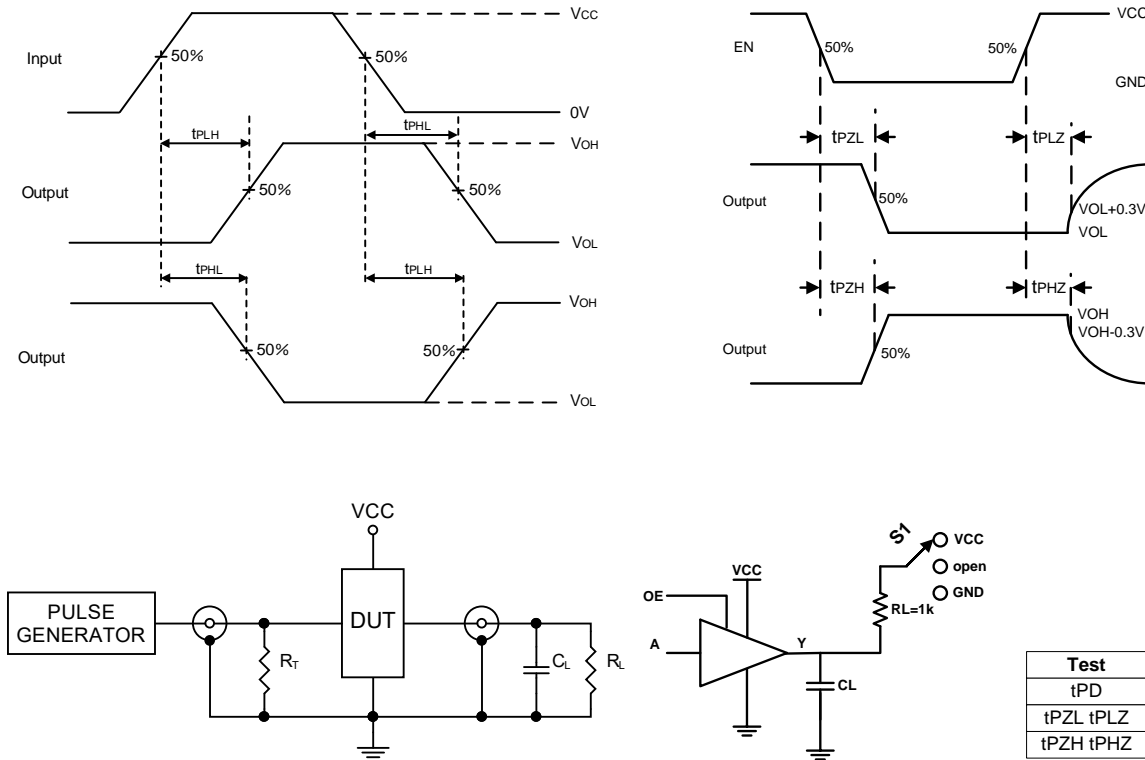
Operating Characteristics

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Symbol	Parameter	Condition	Typ	Unit
C_{PD}	Power Dissipation Capacitance ⁽⁶⁾	No load, $f = 1\text{ MHz}$	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



CL includes probe and jig capacitance

All input pulses are supplied by generators having the following characteristics: PRR ≤ 1MHz, ZO=50Ω, tr ≤ 3ns, tf ≤ 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

Package Dimension

SC70-5

SOT23-5

DFN6(1×1.5)

Ordering information

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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