Single 2-Input AND Gate

MC74HC1G08

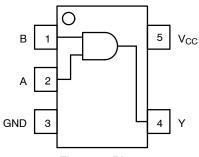
The MC74HC1G08 is a high speed CMOS 2-input AND gate fabricated with silicon gate CMOS technology.

The internal circuit is composed of multiple stages, including a buffer output which provides high noise immunity and stable output.

The MC74HC1G08 output drive current is 1/2 compared to MC74HC series.

Features

- High Speed: $t_{PD} = 7 \text{ ns} (Typ)$ at $V_{CC} = 5 \text{ V}$
- Low Power Dissipation: $I_{CC} = 1 \mu A$ (Max) at $T_A = 25^{\circ}C$
- High Noise Immunity
- Balanced Propagation Delays (t_{pLH} = t_{pHL})
- Symmetrical Output Impedance $(I_{OH} = I_{OL} = 2 \text{ mA})$
- Chip Complexity: < 100 FETs
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant





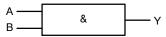


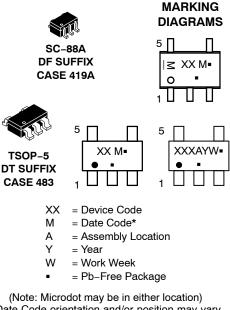
Figure 2. Logic Symbol

PIN ASSIGNMENT					
1	В				
2	A				
3	GND				
4	Y				
5	V _{CC}				

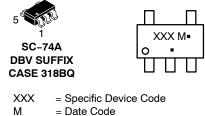


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(Note: Microdot may be in either location) *Date Code orientation and/or position may vary depending upon manufacturing location.



= Date Code = Pb-Free Package

(Note: Microdot may be in either location)

FUNCTION TABLE

Inp	uts	Output
Α	в	Y
L	L	L
L	Н	L
н	L	L
Н	Н	Н

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 6 of this data

MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V _{CC}	DC Supply Voltage	SC-88A (NLV), TSOP-5 SC-88A, SC-74A	-0.5 to +7.0 -0.5 to +6.5	V
V _{IN}	DC Input Voltage		-0.5 to $V_{CC}\ +0.5$	V
V _{OUT}	DC Output Voltage		-0.5 to $V_{CC}\ +0.5$	V
I _{IK}	DC Input Diode Current		±20	mA
I _{OK}	DC Output Diode Current		±20	mA
I _{OUT}	DC Output Source/Sink Current		±12.5	mA
I_{CC} or I_{GND}	DC Supply Current per Supply Pin or Ground Pin		±25	mA
T _{STG}	Storage Temperature Range		-65 to +150	°C
ΤL	Lead Temperature, 1 mm from Case for 10 Seconds		260	°C
TJ	Junction Temperature Under Bias		+ 150	°C
θ_{JA}	Thermal Resistance (Note 1)	SC88A SC74A	377 320	°C/W
P _D	Power Dissipation in Still Air at 85°C	SC88A SC74A	332 390	mW
MSL	Moisture Sensitivity		Level 1	
F _R	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in	
V_{ESD}	ESD Withstand Voltage (Note 2)	Human Body Model Charged Device Model	2000 1000	V
ILATCHUP	Latchup Performance (Note 3)	SC–88A (NLV), TSOP–5 SC–88A, SC–74A	±500 ±100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
Measured with minimum pad spacing on an FR4 board, using 10 mm-by-1 inch, 20 ounce copper trace with no air flow per JESD51-7.
HBM tested to ANSI/ESDA/JEDEC JS-001-2017. CDM tested to JESD22-C101-F. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued per JEDEC/JEP172A.

3. Tested to EIA/JESD78 Class II.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage	2.0	6.0	V
V _{IN}	DC Input Voltage	0.0	V _{CC}	V
V _{OUT}	DC Output Voltage	0.0	V _{CC}	V
T _A	Operating Temperature Range	- 55	+ 125	°C
t _r , t _f	Input Rise and Fall Time SC–88A (NLV), TS $$V_{\rm CC}=$V_{\rm CC}=$V$	2.0 V 0 3.0 V 0 4.5 V 0	1000 600 500 400	ns
	Input Rise and Fall Time SC-88A, SC $$V_{\rm CC}=$V_{\rm CC}=2.3$ V to $$V_{\rm CC}=3.0$ V to $$V_{\rm CC}=4.5$ V to	2.0 V 0 2.7 V 0 3.6 V 0	20 20 10 5	ns/V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

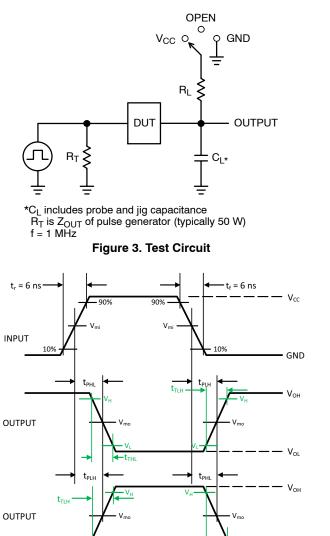
DC ELECTRICAL CHARACTERISTICS

			v _{cc}	Т	A = 25°	С	-40°C ≤ 1	Γ _A ≤ 85°C	–55°C ≤ T	A ≤ 125°C	
Symbol	Parameter	Test Conditions	(V)	Min	Тур	Max	Min	Max	Min	Max	Unit
V _{IH}	High-Level Input Voltage		2.0 3.0 4.5 6.0	1.5 2.1 3.15 4.20	- - -	- - -	1.5 2.1 3.15 4.20	- - -	1.5 2.1 3.15 4.20	- - -	V
V _{IL}	Low-Level Input Voltage		2.0 3.0 4.5 6.0	- - -	- - -	0.5 0.9 1.35 1.80	- - -	0.5 0.9 1.35 1.80	- - - -	0.5 0.9 1.35 1.80	V
V _{OH}	High-Level Output Voltage		2.0 3.0 4.5 6.0	1.9 2.9 4.4 5.9	2.0 3.0 4.5 6.0	- - -	1.9 2.9 4.4 5.9	- - -	1.9 2.9 4.4 5.9	- - -	V
		$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OH} = -2 \text{ mA}$ $I_{OH} = -2.6 \text{ mA}$	4.5 6.0	4.18 5.68	4.31 5.80		4.13 5.63		4.08 5.58		
V _{OL}	Low-Level Output Voltage	$\begin{array}{l} V_{IN} = V_{IH} \text{ or } V_{IL} \\ I_{OL} = 20 \ \mu A \end{array}$	2.0 3.0 4.5 6.0	- - -	0.0 0.0 0.0 0.0	0.1 0.1 0.1 0.1		0.1 0.1 0.1 0.1	- - -	0.1 0.1 0.1 0.1	V
		$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OL} = 2 \text{ mA}$ $I_{OL} = 2.6 \text{ mA}$	4.5 6.0		0.17 0.18	0.26 0.26	- -	0.33 0.33	- -	0.40 0.40	
I _{IN}	Input Leakage Current	V _{IN} = 6.0 V or GND	6.0	-	-	±0.1	-	±1.0	-	±1.0	μΑ
Icc	Quiescent Supply Current	$V_{IN} = V_{CC}$ or GND	6.0	-	-	1.0	-	10	-	40	μΑ

AC ELECTRICAL CHARACTERISTICS

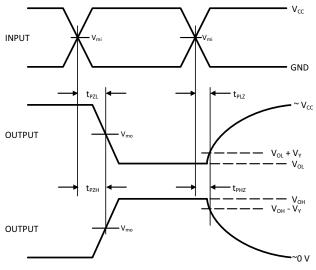
			т	T _A = 25°C		$-40^\circ C \le T_A \le 85^\circ C$		$-55^\circ C \leq T_A \leq 125^\circ C$		
Symbol	Parameter	Test Conditions	Min	Тур	Max	Min	Max	Min	Max	Unit
t _{PLH} ,	Propagation Delay,	$V_{CC} = 5.0 \text{ V} C_L = 15 \text{ pF}$	1	3.5	15	-	20	-	25	ns
t _{PHL}	(A or B) to Y	$ \begin{array}{ll} V_{CC} = 2.0 \ V & C_L = 50 \ pF \\ V_{CC} = 3.0 \ V & \\ V_{CC} = 4.5 \ V & \\ V_{CC} = 6.0 \ V & \end{array} $		20 11 8 7	100 27 20 17		125 35 25 21	- - -	155 90 35 26	
t _{TLH} ,	Output Transition	$V_{CC} = 5.0 \text{ V}$ $C_{L} = 15 \text{ pF}$	-	3	10	_	15	-	20	ns
t _{THL}	Time	$ \begin{array}{ll} V_{CC} = 2.0 \ V & C_L = 50 \ pF \\ V_{CC} = 3.0 \ V & \\ V_{CC} = 4.5 \ V & \\ V_{CC} = 6.0 \ V & \end{array} $		25 16 11 9	125 35 25 21		155 45 31 26	- - -	200 60 38 32	
C _{IN}	Input Capacitance		-	5	10	-	10	_	10	pF
	Typical @ 25°C, V _{CC} = 5.0 V									
C _{PD}	Power Dissipation Capacitance (Note 4)						10			pF

4. 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: $I_{CC(OPR)} = C_{PD} \bullet V_{CC} \bullet f_{in} + I_{CC}$. C_{PD} is used to determine the no-load dynamic power consumption; $P_D = C_{PD} \bullet V_{CC}^2 \bullet f_{in} + I_{CC} \bullet V_{CC}$.



Test	Switch Position	C _L , pF	R_L, Ω
t_{PLH} / t_{PHL}	Open		Х
t _{TLH} / t _{THL} (Note 5)	Open	See AC Characteristics Table	х
t _{PLZ} / t _{PZL}	V _{CC}	Table	1 k
t_{PHZ} / t_{PZH}	GND		1 k

X - Don't Care





VOL

		V _{mo} , V				
V_{CC}, V	V _{mi} , V	t _{PLH} , t _{PHL}	$t_{\text{PZL}}, t_{\text{PLZ}}, t_{\text{PZH}}, t_{\text{PHZ}}$	V _L , V	V _H , V	V _Y , V
3.0 to 3.6	V _{CC} /2	V _{CC} /2	V _{CC} /2	V _{OL} + 0.1 (V _{OH} – V _{OL})	V _{OL} + 0.9 (V _{OH} – V _{OL})	0.3
4.5 to 5.5	V _{CC} /2	V _{CC} /2	V _{CC} /2	V _{OL} + 0.1 (V _{OH} – V _{OL})	V_{OL} + 0.9 (V_{OH} – V_{OL})	0.3

5. t_{TLH} and t_{THL} are measured from 10% to 90% of (V_{OH} - V_{OL}), and 90% to 10% of (V_{OH} - V_{OL}), respectively.

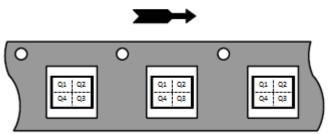
ORDERING INFORMATION

Device	Packages	Specific Device Code	Pin 1 Orientation (See below)	Shipping [†]
MC74HC1G08DFT1G	SC-88A	H2	Q2	3000 / Tape & Reel
NLVHC1G08DFT1G*	SC-88A	H2	Q2	3000 / Tape & Reel
MC74HC1G08DFT2G	SC-88A	H2	Q4	3000 / Tape & Reel
NLVHC1G08DFT2G*	SC-88A	H2	Q4	3000 / Tape & Reel
MC74HC1G08DTT1G	TSOP-5	H2	Q4	3000 / Tape & Reel
NLVHC1G08DTT1G*	TSOP-5	H2	Q4	3000 / Tape & Reel
MC74HC1G08DBVT1G	SC-74A	H2	Q4	3000 / Tape & Reel

†For complete information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

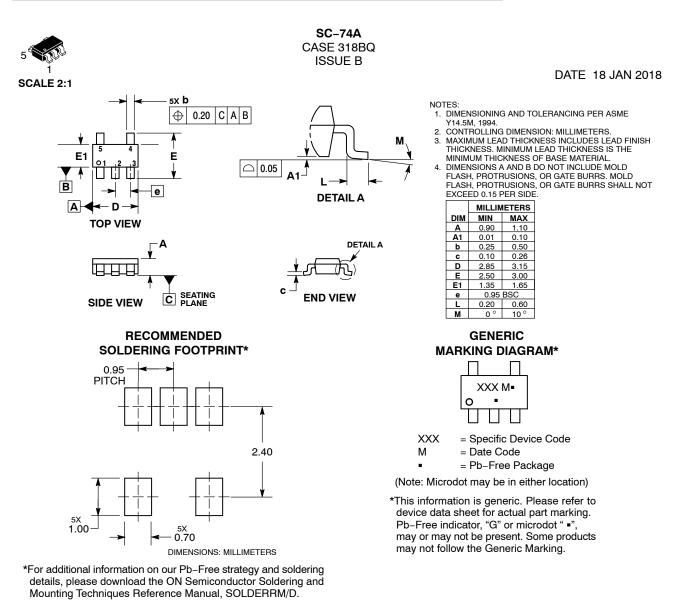
*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

Pin 1 Orientation in Tape and Reel



Direction of Feed





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