ET74AHC08 - Quadruple 2-Input AND Gates

General Description

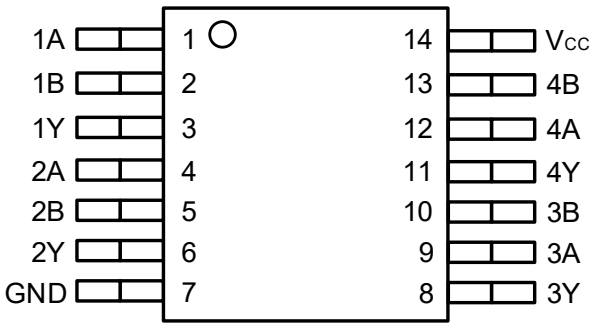
The ET74AHC08 are quad 2-input AND gates. Inputs are over voltage tolerant. This feature allows the use of these devices as translators in mixed voltage environments.

Features

- Wide Operating Voltage Range:1.65V to 5.5V
- ±8mA Balanced Output Sink and Source Capability
- ESD Protection Complies with JESD22 Standard
  -- HBM: ±2000V Pass (JEDEC JS-001)
  -- CDM: ±1000V Pass (JEDEC JS-002)
- Latch-up Performance Exceeds ±200mA per JEDEC JESD78F
- Part No. and Package Information

Part No.	Package	Packing Option	MSL
ET74AHC08M	SOP14 (8.65mm × 3.9mm)	Tape and Reel, 4K/Reel	Level 3
ET74AHC08V	TSSOP14 (4.96mm × 6.4mm)	Tape and Reel, 4K/Reel	Level 3

Pin Configuration



ET74AHC08M/ET74AHC08V

Figure1. Top View

Pin Function

Pin		I/O	Description
Name	No.		
1A	1	Input	Channel 1, Input A
1B	2	Input	Channel 1, Input B
1Y	3	Output	Channel 1, Output Y
2A	4	Input	Channel 2, Input A
2B	5	Input	Channel 2, Input B
2Y	6	Output	Channel 2, Output Y
GND	7	—	Ground
3Y	8	Output	Channel 3, Output Y
3A	9	Input	Channel 3, Input A
3B	10	Input	Channel 3, Input B
4Y	11	Output	Channel 4, Output Y
4A	12	Input	Channel 4, Input A
4B	13	Input	Channel 4, Input B
VCC	14	—	Supply Voltage

Block Diagram

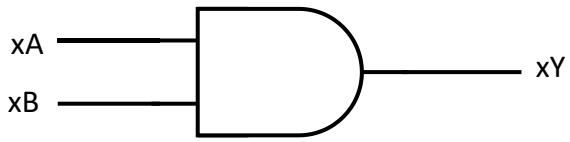


Figure2. Logic Symbol

Functional Description

Function Table

Input		Output
xA	xB	xY
L	L	L
L	H	L
H	L	L
H	H	H

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage(VCC Pin)		-0.5 to 6.5	V
V_I	DC Input Voltage[1]		$-0.5 \le V_I \le 6.5$	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		-50	mA
I_{OK}	DC Output Diode Current V_O < GND, V_O > V_{CC}		±50	mA
I_O	DC Output Sink Current		±50	mA
I_{CC}	DC Supply Current per Supply Pin		100	mA
I_{GND}	DC Ground Current per Supply Pin		-100	mA
T_{STG}	Storage Temperature Range		-65 to 150	°C
T_L	Lead Temperature, Soldering 10 Seconds		260	°C
T_J	Max Junction Temperature		150	°C
V_{ESD}	ESD Classification	Human Body Model [2]	±2000	V
		Charged Device Model [3]	±1000	
I_{LU}	Max Latch up Current Above V_{CC} and GND at 125°C [4]		±200	mA

Stresses exceeding those listed in this 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.

Note1: I_O absolute maximum rating must be observed.

Note2: HBM tested per JEDEC JS-001;

Note3: CDM tested per JEDEC JS-002;

Note4: Latch up Current Maximum Rating tested per JEDEC JESD78F.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage	2	5.5	V
V_{IN}	DC Input Voltage	0	5.5	V
V_{OUT}	DC Output Voltage(High or Low State)	0	5.5	V
T_A	Operating Temperature Range	-40	125	°C

Electrical Characteristics

DC Electrical Characteristics

Over operating free-air temperature range; typical values measured at T_A = 25°C (unless otherwise noted)

Symbol	Parameter	Condition	V_{CC}(V)	T_A = 25°C			-40°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
V_{IH}	High−Level Input Voltage		2.0	1.5			1.5		V
			3.0	2.1			2.1		
			5.5	3.85			3.85		
V_{IL}	Low−Level Input Voltage		2.0			0.5		0.5	V
			3.0			0.9		0.9	
			5.5			1.65		1.65	
V_{OH}	High−Level Output Voltage	I_{OH} = -50uA	2 to 5.5	V_{CC} - 0.1	V_{CC}		V_{CC} - 0.1		V
		I_{OH} = -4mA	3	2.58			2.4		
		I_{OH} = -8mA	4.5	3.54			3.7		
V_{OL}	Low−Level Output Voltage	I_{OL} = 50uA	2 to 5.5			0.1		0.1	V
		I_{OL} = 4mA	3			0.36		0.55	
		I_{OL} = 8mA	4.5			0.36		0.55	
I_I	Input Leakage Current	V_{IN} = 5.5V or GND	0 to 5.5			0.1		2.0	uA
I_{CC}	Quiescent Supply Current	V_{IN} = 5.5V or GND	5.5			1		40	uA

Switching Characteristics

$t_r = t_f = 3ns$

Symbol	Parameter	Condition	V_{CC}(V)	T_A = 25 °C			-40°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay (Figure3 and 4)	C_L= 15pF	3 to 3.6		7.2	10.7	1	13.2	ns
		C_L= 50pF	3 to 3.6		9.2	15.7	1	18.7	
		C_L= 15pF	4.5 to 5.5		6.6	8.6	1	10.1	
		C_L= 50pF	4.5 to 5.5		8.1	10.6	1	12.6	

Operating Characteristics

Over operating free-air temperature range; typical values measured at T_A = 25°C (unless otherwise noted)

Symbol	Parameter	Condition	Typ	Unit
C_{IN}	Input Capacitance	V_{CC} = 5.5V, V_I = 0V or V_{CC}	5	pF
C_{PD}	Power Dissipation Capacitance (5)	10MHz, V_{CC} = 3.3V, V_I = 0V or V_{CC}	10	pF
		10MHz, V_{CC} = 5.5V, V_I = 0V or V_{CC}	13	

Note5: C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

AC Test Circuit

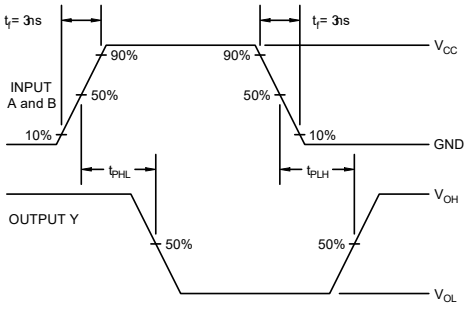


Figure 3. Switching Waveform

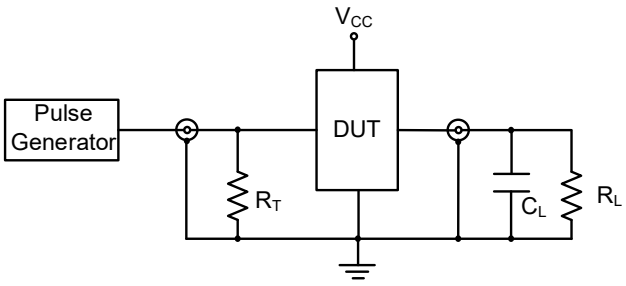
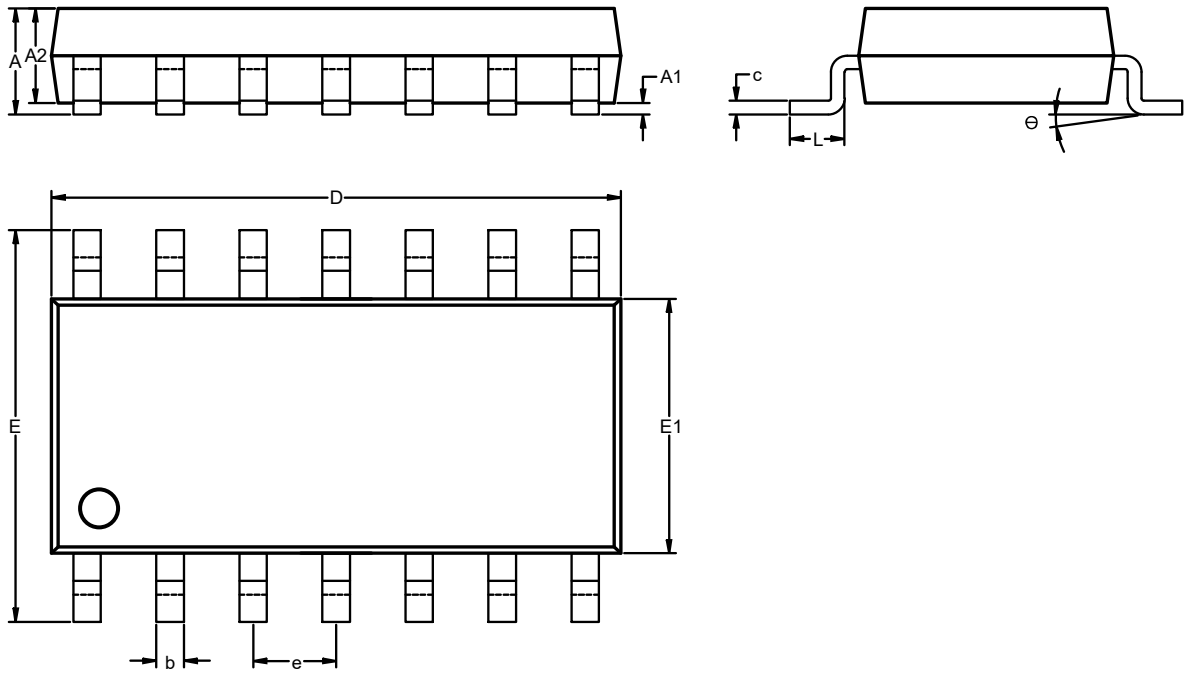


Figure4. Test Circuit

Package Dimension

SOP14 (8.65mm × 3.9mm)

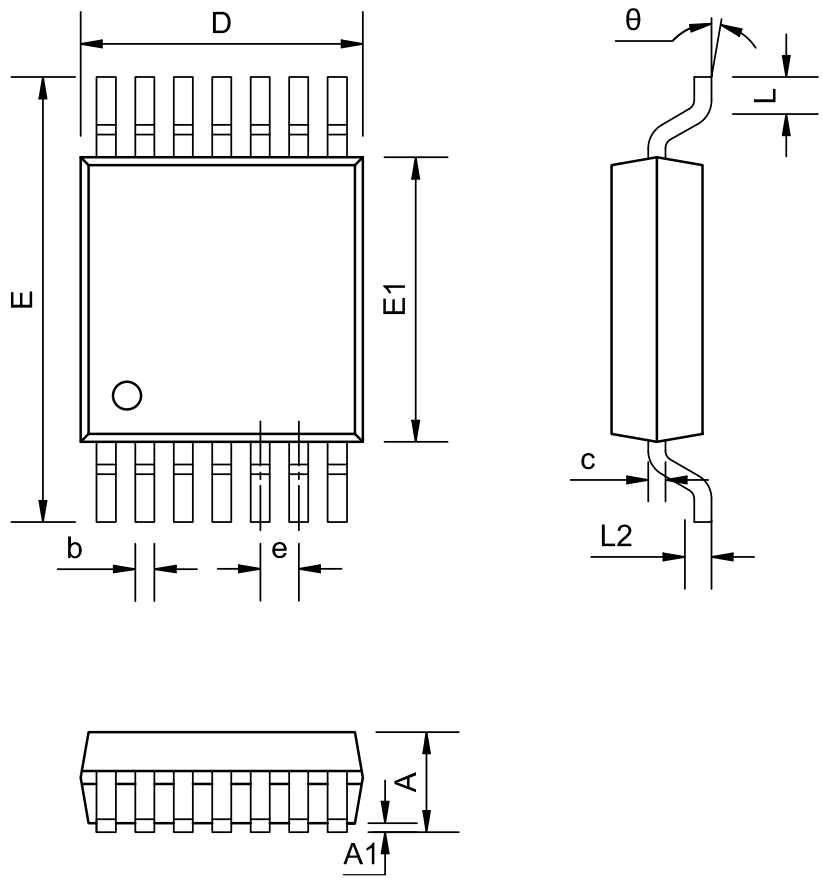


COMMON DIMENSIONS

(Unit: mm)

Symbol	Min	Nom	Max
A	--	--	1.75
A1	0.10	0.15	0.25
A2	1.35	1.45	1.55
b	0.36	--	0.51
c	0.18	--	0.25
D	8.55	8.65	8.75
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.22	1.27	1.32
L	0.45	0.60	0.80
θ	0°	--	8°

TSSOP14(4.96mm × 4.4mm)



COMMON DIMENSIONS

(Unit: mm)

Symbol	Min	Max
A	--	1.20
A1	0.05	0.15
b	0.19	0.30
c	0.15 REF	
D	4.86	5.10
E	6.20	6.60
E1	4.30	4.50
e	0.65 BSC	
L	1.00 REF	
L2	0.25 BSC	
θ	0°	8°

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2025-11-6	Official Version	Wangar	Yangxx	Liujy