

SN74AC08-EP 四路双输入正与门

1 特性

- 受控基线
 - 一个组装/测试厂，一个制造厂
- 工作温度范围为 -55°C 至 125°C
- 增强型制造源减少 (DMS) 支持
- 增强型产品变更通知
- 资质谱系†
- 2V 至 6V V_{CC} 运行
- 允许接受输入电压 6V
- 5V 时 t_{pd} 最大值为 7.5ns

1

2 说明

SN74AC08 是四路双输入正与门。该器件以正逻辑执行布尔函数 $Y = A \cdot B$ 或 $Y = \overline{A} + \overline{B}$ 。

封装信息

器件型号	封装 ¹	封装尺寸 ²
SN74AC08-EP	D (SOIC , 14)	8.65mm × 3.91mm

- 如需了解所有可用封装，请参阅数据表末尾的可订购产品附录。
- 封装尺寸 (长 × 宽) 为标称值，并包括引脚 (如适用)。



图 2-1. 逻辑图，每个逻辑门 (正逻辑)

¹ † 元件资质符合 JEDEC 和行业标准，可在工作温度范围内可靠运行。这包括但不限于高加速应力测试 (HAST) 或偏压 85/85、温度循环、热压器或无偏压 HAST、电迁移、金属间键合寿命和模型化合物寿命。这些资质测试不能作为在超出额定性能和环境限制的条件下使用此组件的依据。



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3 Revision History

注：以前版本的页码可能与当前版本的页码不同

Changes from Revision * (September 2003) to Revision A (June 2023)	Page
• 添加了封装信息表、引脚功能表、热信息表、器件功能模式、器件和文档支持部分以及机械、封装和可订购信息部分.....	1

4 Pin Configuration and Functions

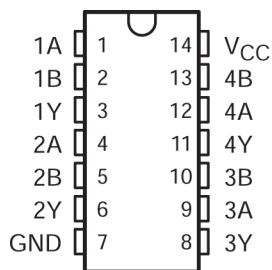


图 4-1. D Package (Top View)

表 4-1. Pin Functions

PIN		TYPE	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
V _{CC}	14	—	Positive Supply

5 Specifications

5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

		MIN	MAX	UNIT
V_{CC}	Supply voltage range	-0.5	7	V
V_I ¹	Input voltage range	-0.5	$V_{CC} + 0.5$	V
V_O ¹	Output voltage range	-0.5	$V_{CC} + 0.5$	V
I_{IK}	Input clamp current	$(V_I < 0 \text{ or } V_I > V_{CC})$		± 20 mA
I_{OK}	Output clamp current	$(V_O < 0 \text{ or } V_O > V_{CC})$		± 20 mA
I_O	Continuous output current	$(V_O = 0 \text{ to } V_{CC})$		± 50 mA
	Continuous current through V_{CC} or GND			± 200 mA
T_{stg}	Storage temperature range	-65	150	°C

- (1) Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

5.2 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)¹

		MIN	MAX	UNIT
V_{CC}	Supply voltage	2	6	V
V_{IH}	High-level input voltage	$V_{CC} = 3 \text{ V}$	2.1	V
		$V_{CC} = 4.5 \text{ V}$	3.15	
		$V_{CC} = 5.5 \text{ V}$	3.85	
V_{IL}	Low-level input voltage	$V_{CC} = 3 \text{ V}$	0.9	V
		$V_{CC} = 4.5 \text{ V}$	1.35	
		$V_{CC} = 5.5 \text{ V}$	1.65	
V_I	Input voltage	0	V_{CC}	V
V_O	Output voltage	0	V_{CC}	V
I_{OH}	High-level output current	$V_{CC} = 3 \text{ V}$	-12	mA
		$V_{CC} = 4.5 \text{ V}$	-24	
		$V_{CC} = 5.5 \text{ V}$	-24	
I_{OL}	Low-level output current	$V_{CC} = 3 \text{ V}$	12	mA
		$V_{CC} = 4.5 \text{ V}$	24	
		$V_{CC} = 5.5 \text{ V}$	24	
$\Delta t/\Delta v$	Input transition rise or fall rate		8	ns/V
T_A	Operating free-air temperature	-55	125	°C

- (1) All unused inputs of the device must be held at V_{CC} or GND for proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

5.3 Thermal Information

THERMAL METRIC ⁽¹⁾		SN74AC08-EP	UNIT
		D (SOIC)	
		14 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	86	°C/W

(1) For more information about traditional and new thermal metrics, see the [IC Package Thermal Metrics](#)

5.4 Electrical Characteristics

over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	V_{CC}	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
				MIN	TYP	MAX			
V_{OH}	$I_{OH} = -50\ \mu\text{A}$		3 V	2.9			2.9	V	
			4.5 V	4.4			4.4		
			5.5 V	5.4			5.4		
	$I_{OH} = -12\ \text{mA}$		3 V	2.56			2.4		
			4.5 V	3.86			3.7		
			5.5 V	4.86			4.7		
V_{OL}	$I_{OL} = 50\ \mu\text{A}$		3 V	0.002			0.1	V	
			4.5 V	0.001			0.1		
			5.5 V	0.001			0.1		
	$I_{OL} = 12\ \text{mA}$		3 V	0.36			0.5		
			4.5 V	0.36			0.5		
			5.5 V	0.36			0.5		
I_I	A or B ports	$V_I = V_{CC}$ or GND	5.5 V	± 0.1			± 1	μA	
I_{CC}		$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V	2			40	μA	
C_i		$V_I = V_{CC}$ or GND	5 V	4.5				pF	

5.5 Switching Characteristics, $V_{CC} = 3.3\ \text{V} \pm 0.3\ \text{V}$

over recommended operating free-air temperature range, $V_{CC} = 3.3\ \text{V} \pm 0.3\ \text{V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	Y	1.5	7.5	9.5	1	12.5	ns
t_{PHL}			1.5	7	8.5	1	11.5	

5.6 Switching Characteristics, $V_{CC} = 5\ \text{V} \pm 0.5\ \text{V}$

over recommended operating free-air temperature range, $V_{CC} = 5\ \text{V} \pm 0.5\ \text{V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

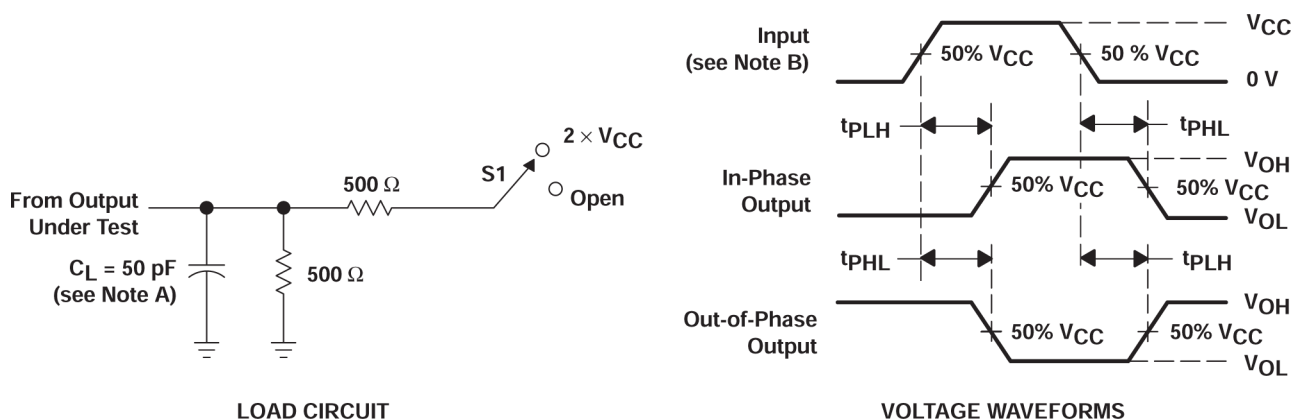
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	Y	1.5	5.5	7.5	1	9	ns
t_{PHL}			1.5	5.5	7	1	8.5	

5.7 Operating Characteristics

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

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance	$C_L = 50\text{ pF}$, $f = 1\text{ MHz}$	20	pF

6 Parameter Measurement Information



- A. C_L includes probe and jig capacitance.
- B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O = 50 \Omega$, $t_r \leq 2.5$ ns, $t_f \leq 2.5$ ns.
- C. The outputs are measured one at a time with one input transition per measurement.

图 6-1. Load Circuit and Voltage Waveforms

TEST	S1
t_{PLH}/t_{PHL}	Open

7 Detailed Description

7.1 Functional Block Diagram

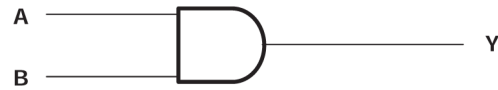


图 7-1. Logic Diagram, Each Gate (Positive Logic)

7.2 Device Functional Modes

表 7-1. Function Table (Each Gate)

INPUTS		OUTPUT Y
A	B	
H	H	H
L	X	L
X	L	L

8 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

8.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

8.2 支持资源

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ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

8.5 术语表

TI 术语表 本术语表列出并解释了术语、首字母缩略词和定义。

9 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74AC08MDREP	Obsolete	Production	SOIC (D) 14	-	-	Call TI	Call TI	-55 to 125	SAC08MEP

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "-" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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OTHER QUALIFIED VERSIONS OF SN74AC08-EP :

- Catalog : [SN74AC08](#)

- Automotive : [SN74AC08-Q1](#)

- Military : [SN54AC08](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Military - QML certified for Military and Defense Applications

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