SCAS081A - NOVEMBER 1989 - REVISED APRIL 1996

- Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise
- **EPIC™** (Enhanced-Performance Implanted CMOS) 1-µm Process
- 500-mA Typical Latch-Up Immunity at 125°C
- **Package Options Include Plastic** Small-Outline (D) Packages and Standard Plastic 300-mil DIPs (N)

D OR N PACKAGE (TOP VIEW) 16 🛮 1B 1A l 15 2A 1Y [2Y 🛮 3 14 🛮 2B GND [13 V_{CC} 12 VCC GND [5 11 3A 3Y 🛮 6 10 🛮 3B 4Y 🛛 7 9**∏** 4A 4B

description

This device contains four independent 2-input exclusive-OR gates. It performs the Boolean function $Y = A \oplus B = \overline{A}B + A\overline{B}$ in positive logic.

A common application is as a true/complement element. If one of the inputs is low, the other input is reproduced in true form at the output. If one of the inputs is high, the signal on the other input is reproduced inverted at the output.

The 74AC11086 is characterized for operation from -40°C to 85°C.



INP	UTS	OUTPUT
Α	В	Y
7 1	L	L
) L \	Н	Н
Н	L	Н
Н	Н	L

logic symbol†

		H L	H H		
1	Н	Н	L		
1A	1			2	
1B	16	=1	- 1	2	1
2A	15			2	
	14			3	2
2B	11	 			
3A	10	1		6	3
3B 4A	9				
4A 4B	8	1		7	4
4B		<u> </u>			

[†] This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.



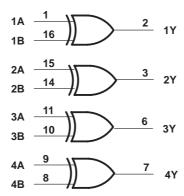
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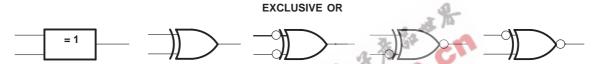
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logic diagram (positive logic)

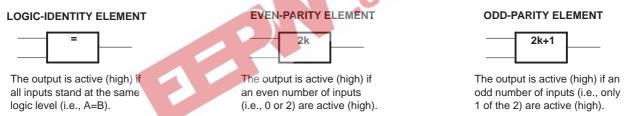


exclusive-OR logic

An exclusive-OR gate has many applications, some of which can be represented better by alternative logic symbols.



These are five equivalent exclusive-OR symbols valid for a 74AC11086 gate in positive logic; negation may be shown at any two ports.



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V _{CC}	–0.5 V to 7 V
Input voltage range, V _I (see Note 1)	0.5 V to V _{CC} + 0.5 V
Output voltage range, V _O (see Note 1)	0.5 V to V _{CC} + 0.5 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	±20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	±50 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	±50 mA
Continuous current through V _{CC} or GND	±100 mA
Maximum power dissipation at $T_A = 55^{\circ}C$ (in still air) (see Note 2): D package	1.3 W
N package	1.1 W
Storage temperature range, T _{stg}	–65°C to 150°C

[†] 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.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
 - 2. The maximum package power dissipation is calculated using a junction temperature of 150 °C and a board trace length of 750 mils, except for the N package, which has a trace length of zero.



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recommended operating conditions

			MIN	NOM	MAX	UNIT
Vcc	CC Supply voltage		3	5	5.5	V
		V _{CC} = 3 V	2.1			
VIH	High-level input voltage	V _{CC} = 4.5 V	3.15			V
		V _{CC} = 5.5 V	3.85			
		V _{CC} = 3 V			0.9	
V_{IL}	Low-level input voltage	V _{CC} = 4.5 V			1.35	V
		V _{CC} = 5.5 V			1.65	
٧ı	V _I Input voltage				VCC	V
٧o	Output voltage		0		VCC	V
		V _{CC} = 3 V		-4		
loн	High-level output current	V _{CC} = 4.5 V			-24	mA
		V _{CC} = 5.5 V			-24	
		V _{CC} = 3 V			12	
lOL	Low-level output current	V _{CC} = 4.5 V			24	mA
		V _{CC} = 5.5 V			24	
Δt/Δν	Input transition rise or fall rate	* A* A	0		10	ns/V
T _A	Operating free-air temperature	2 13	-40		85	°C

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

PARAMETER	TEST CONDITIONS	Vaa	T,	_Δ = 25°C	;	MIN	MAX	UNIT
		Vcc	MIN	TYP	MAX	IVIIIV		UNIT
		3 V	2.9			2.9		
	$I_{OH} = -50 \mu\text{A}$	4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
Voн	$I_{OH} = -4 \text{ mA}$	3 V	2.58			2.48		V
		4.5 V	3.94			3.8		
	$I_{OH} = -24 \text{ mA}$		4.94			4.8		
	$I_{OH} = -75 \text{ mA}^{\dagger}$	5.5 V				3.85		
	I _{OL} = 50 μA	3 V			0.1		0.1	
		4.5 V			0.1		0.1	
					0.1		0.1	
VOL	I _{OL} = 12 mA	3 V			0.36		0.44	4 V
	I _{OL} = 24 mA				0.36		0.44	
					0.36		0.44	
	$I_{OL} = 75 \text{ mA}^{\dagger}$	5.5 V					1.65	
lį	$V_I = V_{CC}$ or GND	5.5 V			±0.1		±1	μΑ
Icc	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			4		40	μΑ
C _i	$V_I = V_{CC}$ or GND	5 V		3.5				pF

[†] Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.



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switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V \pm 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	ТО	TO T _A = 25°C	MIN	MAX	UNIT		
PARAMETER	(INPUT) (OI	(OUTPUT)	MIN	TYP	MAX	IVIIIN I	WAX	UNIT
t _{PLH}	A or B	V	1.5	5.6	9.4	1.5	10.6	20
t _{PHL}	AUIB	T T	1.5	5.1	7.4	1.5	8.2	ns

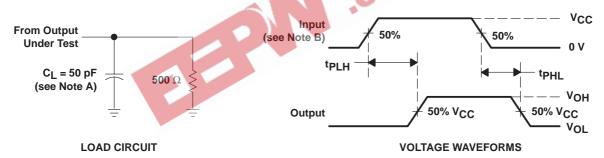
switching characteristics over recommended operating free-air temperature range, $V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	TO $T_A = 25^{\circ}C$ (OUTPUT) MIN TYP MAX	TO T _A = 25°C	MIN	MAX	UNIT		
	(INPUT)		MIN	TYP	MAX	IVIIIN	WAX	UNIT
t _{PLH}	A or D	V	1.5	3.8	6.8	1.5	7.6	20
t _{PHL}	A or B	ī	1.5	3.8	6.2	1.5	6.8	ns

operating characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CO	TYP	UNIT	
C _{pd}	Power dissipation capacitance per gate	C _L = 50 pF,	f = 1 MHz	27	pF

PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L includes probe and jig capacitance.

- B. Input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, $Z_O = 50 \ \Omega$, $t_f = 3 \ ns$, $t_f = 3 \ ns$.
- C. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms



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