SCAS028A - D2957, JULY 1987 - REVISED APRIL 1993

- Inputs Are TTL-Voltage Compatible
- Flow-Through Architecture Optimizes
 PCB Layout
- 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 Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

description

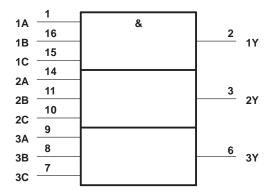
These devices contain three independent 3-input AND gates. They <u>perform the</u> Boolean functions $Y = A \cdot B \cdot C$ or $Y = \overline{A} + \overline{B} + \overline{C}$ in positive logic.

The 54ACT11011 is characterized for operation over the full military temperature range of -55° C to 125°C. The 74ACT11011 is characterized for operation from -40° C to 85°C.

FUNCTION TABLE (each gate)

	INPUTS	OUTPUT				
Α	В	С	Υ			
Н	Н	Н	Н			
L	X	Χ	L			
Х	L	X	L			
Χ	Χ	L	L			

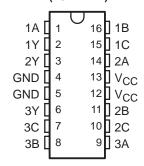
logic symbol†



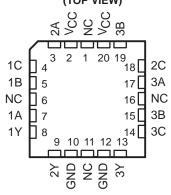
[†] This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for the D, J, and N packages.

54ACT11011 . . . J PACKAGE 74ACT11011 . . . D OR N PACKAGE (TOP VIEW)

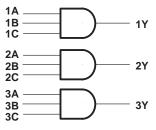


54ACT11011 ... FK PACKAGE (TOP VIEW)



NC - No internal connection

logic diagram (positive logic)



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54ACT11011, 74ACT11011 TRIPLE 3-INPUT POSITIVE-AND GATES

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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)	
Output voltage range, V _O (see Note 1)	
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	
Continuous output current, $I_O(V_O = 0 \text{ to } V_{CC})$	
Continuous current through V _{CC} or GND	
Storage temperature range	

[†] 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.

recommended operating conditions

		54ACT11011		74ACT		
		MIN	MIN MAX		MAX	UNIT
VCC	Supply voltage	4.5	5.5	4.5	5.5	V
VIH	High-level input voltage	2		2		V
V_{IL}	Low-level input voltage		0.8		0.8	V
٧ı	Input voltage	0	VCC	0	Vcc	V
٧o	Output voltage	0	VCC	0	VCC	V
ЮН	High-level output current		-24		-24	mA
lOL	Low-level output current		24		24	mA
Δt/Δν	Input transition rise or fall rate	0	10	0	10	ns/V
TA	Operating free-air temperature	-55	125	- 40	85	°C

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

DADAMETED	TEST CONDITIONS	V	T _A = 25°C			54ACT11011		74ACT11011		LINUT	
PARAMETER		VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT	
VOH	I _{OH} = - 50 μA	4.5 V	4.4			4.4		4.4		V	
		5.5 V	5.4			5.4		5.4			
	love 24 mA	4.5 V	3.94			3.7		3.8			
	$I_{OH} = -24 \text{ mA}$	5.5 V	4.94			4.7		4.8			
	$I_{OH} = -50 \text{ mA}^{\ddagger}$	5.5 V				3.85					
	$I_{OH} = -75 \text{ mA}^{\ddagger}$	5.5 V						3.85		L	
V	ΙΟL = 50 μΑ	4.5 V			0.1		0.1		0.1	V	
		5.5 V			0.1		0.1		0.1		
	I _{OL} = 24 mA	4.5 V			0.36		0.5		0.44		
V_{OL}		5.5 V			0.36		0.5		0.44		
	$I_{OL} = 50 \text{ mA}^{\ddagger}$	5.5 V					1.65				
	$I_{OL} = 75 \text{ mA}^{\ddagger}$	5.5 V							1.65		
IJ	$V_I = V_{CC}$ or GND	5.5 V			± 0.1		± 1		± 1	μΑ	
ICC	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			4		80		40	μΑ	
ΔI _{CC} §	One input at 3.4 V, Other inputs at GND or V _{CC}	5.5 V			0.9		1		1	mA	
C _i	$V_I = V_{CC}$ or GND	5 V		3.5						рF	

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

[§] This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or V_{CC}.



NOTE 1: The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

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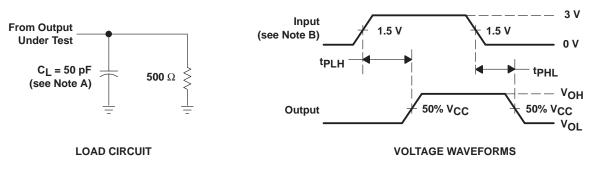
switching characteristics over recommended ranges of supply voltage and free-air temperature (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	TO (OUTPUT)	T _A = 25°C			54ACT11011		74ACT11011		
	(INPUT)		MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
t _{PLH}	A, B, or C	V	1.5	6.5	8.6	1.5	10.2	1.5	9.6	
t _{PHL}		Y	1.5	5.5	7.9	1.5	9.2	1.5	8.7	ns

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

PARAMETER		TEST CONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance per gate	$C_L = 50 \text{ pF}, \qquad f = 1 \text{ MHz}$	28	pF

PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_I includes probe and jig capacitance.

- B. Input pulses are supplied by generators having the following characteristics: PRR \leq 10 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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