

SN54AC11, SN74AC11 TRIPLE 3-INPUT POSITIVE-AND GATES

SCAS532B – AUGUST 1995 – REVISED SEPTEMBER 1996

- **EPIC™ (Enhanced-Performance Implanted CMOS) 1-μm Process**
- **Package Options Include Plastic Small-Outline (D), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic (N) and Ceramic (J) DIPS**

description

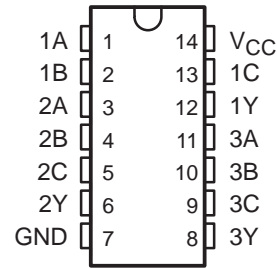
The 'AC11 contain three independent 3-input AND gates. These devices perform the Boolean function $Y = A \cdot B \cdot C$ or $Y = \overline{A + B + C}$ in positive logic.

The SN54AC11 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74AC11 is characterized for operation from -40°C to 85°C .

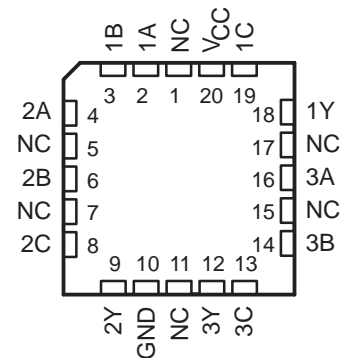
FUNCTION TABLE
(each gate)

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

SN54AC11 ... J OR W PACKAGE
SN74AC11 ... D, DB, N, OR PW PACKAGE
(TOP VIEW)

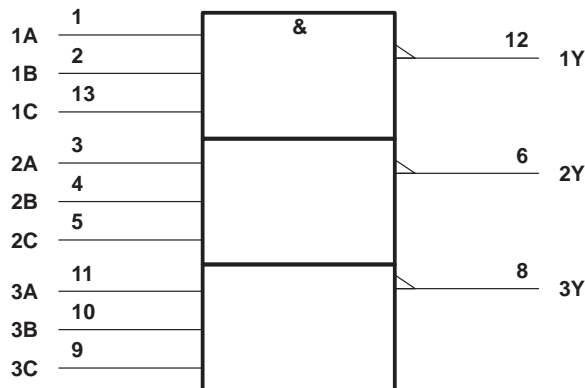


SN54AC11 ... FK PACKAGE
(TOP VIEW)

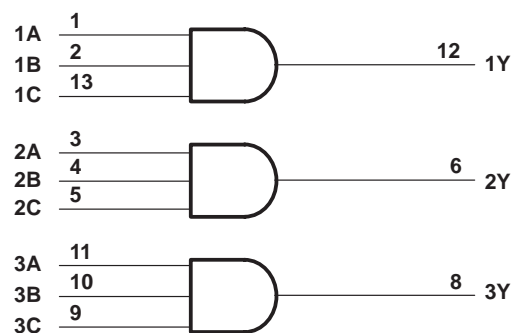


NC – No internal connection

logic symbol†



logic diagram, each gate (positive logic)



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

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



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**TEXAS
INSTRUMENTS**

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SN54AC11, SN74AC11

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)	-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 $V_O > V_{CC}$)	± 20 mA	
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 50 mA	
Continuous current through V_{CC} or GND	± 200 mA	
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2):	D package	1.25 W
	DB package	0.5 W
	N package	1.1 W
	PW package	0.5 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.

recommended operating conditions (see Note 3)

		SN54AC11		SN74AC11		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	2	6	2	6	V
V_{IH}	High-level input voltage	$V_{CC} = 3$ V		2.1		V
		$V_{CC} = 4.5$ V		3.15		
		$V_{CC} = 5.5$ V		3.85		
V_{IL}	Low-level input voltage	$V_{CC} = 3$ V		0.9		V
		$V_{CC} = 4.5$ V		1.35		
		$V_{CC} = 5.5$ V		1.65		
V_I	Input voltage	0	V_{CC}	0	V_{CC}	V
V_O	Output voltage	0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current	$V_{CC} = 3$ V		-12		mA
		$V_{CC} = 4.5$ V		-24		
		$V_{CC} = 5.5$ V		-24		
I_{OL}	Low-level output current	$V_{CC} = 3$ V		12		mA
		$V_{CC} = 4.5$ V		24		
		$V_{CC} = 5.5$ V		24		
$\Delta t/\Delta v$	Input transition rise or fall rate	0	8	0	8	ns/V
T_A	Operating free-air temperature	-55	125	-40	85	$^\circ\text{C}$

NOTE 3: Unused inputs must be held high or low to prevent them from floating.



SN54AC11, SN74AC11 TRIPLE 3-INPUT POSITIVE-AND GATES

SCAS532B – AUGUST 1995 – REVISED SEPTEMBER 1996

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			SN54AC11		SN74AC11		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}	I _{OH} = - 50 μA	3 V	2.9	2.99		2.9		2.9	V	
		4.5 V	4.4	4.49		4.4		4.4		
		5.5 V	5.4	5.49		5.4		5.4		
	I _{OH} = - 12 mA	3 V	2.56			2.4		2.46		
		4.5 V	3.86			3.7		3.76		
	I _{OH} = - 24 mA	4.5 V	3.86			3.7		3.76		
		5.5 V	4.86			4.7		4.76		
I _{OH} = - 50 mA†	5.5 V				3.85					
I _{OH} = - 75 mA†	5.5 V						3.85			
V _{OL}	I _{OL} = 50 μA	3 V		0.002	0.1		0.1	0.1	V	
		4.5 V		0.001	0.1		0.1	0.1		
		5.5 V		0.001	0.1		0.1	0.1		
	I _{OL} = 12 mA	3 V			0.36		0.5	0.44		
		4.5 V			0.36		0.5	0.44		
	I _{OL} = 24 mA	4.5 V			0.36		0.5	0.44		
		5.5 V			0.36		0.5	0.44		
I _{OL} = 50 mA†	5.5 V				1.65					
I _{OL} = 75 mA†	5.5 V						1.65			
I _I	V _I = V _{CC} or GND	5.5 V			±0.1		±1	±1	μA	
I _{CC}	V _I = V _{CC} or GND, I _O = 0	5.5 V			2		40	20	μA	
C _i	V _I = V _{CC} or GND	5 V		2.6					pF	

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

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T _A = 25°C			SN54AC11		SN74AC11		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	Any	Y	1.5	5.5	9.5	1	11	1	10	ns
t _{PHL}			1.5	5.5	8.5	1	10.5	1	9.5	

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T _A = 25°C			SN54AC11		SN74AC11		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	Any	Y	1.5	4	8	1	8.5	1	8.5	ns
t _{PHL}			1.5	4	7	1	8	1	7.5	

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

PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd} Power dissipation capacitance	C _L = 50 pF, f = 1 MHz	20	pF

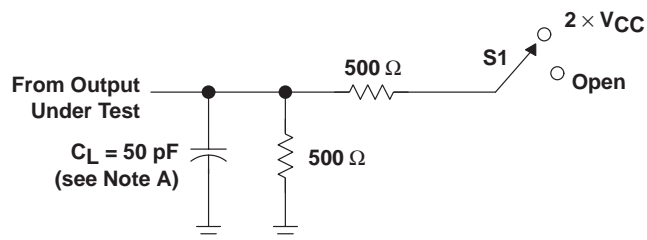


SN54AC11, SN74AC11 TRIPLE 3-INPUT POSITIVE-AND GATES

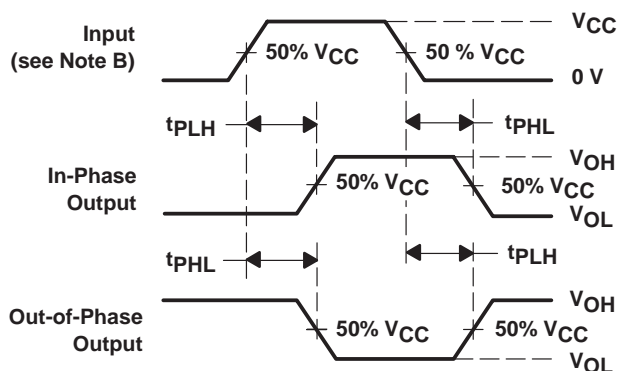
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PARAMETER MEASUREMENT INFORMATION

TEST	S1
tPLH/tPHL	Open



LOAD CIRCUIT



VOLTAGE WAVEFORMS

- NOTES: A. C_L includes probe and jig capacitance.
 B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
 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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SN54AC11, Triple 3-Input Positive-AND Gates

Device Status: Active

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- > [Features](#)
- > [Datasheets](#)
- > [Pricing/Samples/Availability](#)
- > [Application Notes](#)
- > [Related Documents](#)
- > [Training](#)

Parameter Name	SN54AC11
Voltage Nodes (V)	5, 3.3
Vcc range (V)	2.0 to 6.0
Input Level	CMOS
Output Level	CMOS
No. of Gates	3

Description

The 'AC11 contain three independent 3-input AND gates. These devices perform the Boolean

function $Y = A \cdot B \cdot C$ or $Y = \bar{A} + \bar{B} + \bar{C}$ in positive logic.

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Features

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Datasheets

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Pricing/Samples/Availability

<u>Orderable Device</u>	<u>Package</u>	<u>Pins</u>	<u>Temp (°C)</u>	<u>Status</u>	<u>Price/unit USD (100-999)</u>	<u>Pack Qty</u>	<u>DSCC Number</u>	<u>Availability / Samples</u>
5962-8761101DA	<u>W</u>	14	-55 TO 125	ACTIVE	10.27	1		Check stock or order
SNJ54AC11FK	<u>FK</u>	20	-55 TO 125	ACTIVE	10.27	1	5962-87611012A	Check stock or order
SNJ54AC11J	<u>J</u>	14	-55 TO 125	ACTIVE	2.84	1	5962-8761101CA	Check stock or order
SNJ54AC11W	<u>W</u>	14	-55 TO 125	ACTIVE	10.27	1		Check stock or order

Application Reports

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- [Designing With Logic](#) (SDYA009C - Updated: 06/01/1997)
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- [Input And Output Characteristics Of Digital Integrated Circuits](#) (SDYA010 - Updated: 10/01/1996)
- [Live Insertion](#) (SDYA012 - Updated: 10/01/1996)
- [Using High Speed CMOS And Advanced CMOS In Systems With Multiple Vcc](#) (SCLA008 - Updated: 04/01/1996)

Related Documents

- [Documentation Rules \(SAP\) And Ordering Information](#) (SZZU001B, 4 KB - Updated: 05/06/1999)
- [Logic Selection Guide Second Half 2000](#) (SDYU001N, 5035 KB - Updated: 04/17/2000)
- [MicroStar Junior BGA Design Summary](#) (SCET004, 284 KB - Updated: 07/28/2000)
- [More Power In Less Space - Technical Article](#) (SCAU001A, 850 KB - Updated: 03/01/1996)

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