

SN54ALS11A, SN54AS11, SN74ALS11A, SN74AS11 TRIPLE 3-INPUT POSITIVE-AND GATES

SDAS009C – MARCH 1984 – REVISED DECEMBER 1994

- Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

description

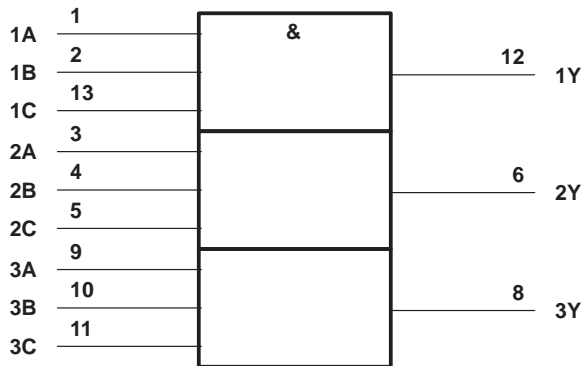
These devices contain three independent 3-input positive-AND gates. They perform the Boolean functions $Y = A \cdot B \cdot C$ or $Y = \overline{A} + \overline{B} + \overline{C}$ in positive logic.

The SN54ALS11A and SN54AS11 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS11A and SN74AS11 are characterized for operation from 0°C to 70°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

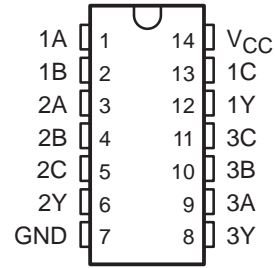
logic symbol†



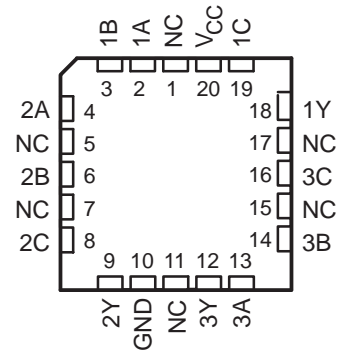
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

SN54ALS11A, SN54AS11 . . . J PACKAGE
SN74ALS11A, SN74AS11 . . . D OR N PACKAGE
(TOP VIEW)

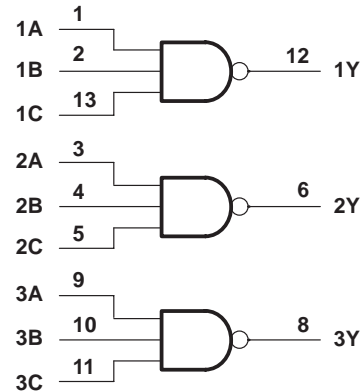


SN54ALS11A, SN54AS11 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

logic diagram (positive logic)



SN54ALS11A, SN54AS11, SN74ALS11A, SN74AS11 TRIPLE 3-INPUT POSITIVE-AND GATES

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

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Operating free-air temperature range, T_A : SN54ALS11A	-55°C to 125°C
SN74ALS11A	0°C to 70°C
Storage temperature range	-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.

recommended operating conditions

		SN54ALS11A			SN74ALS11A			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8‡			0.8	V
				0.7§				
I_{OH}	High-level output current			-0.4			-0.4	mA
I_{OL}	Low-level output current			4			8	mA
T_A	Operating free-air temperature	-55		125	0		70	°C

‡ Applies over temperature range -55°C to 70°C

§ Applies over temperature range 70°C to 125°C

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

PARAMETER	TEST CONDITIONS	SN54ALS11A			SN74ALS11A			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5$ V, $I_I = -18$ mA			-1.5			-1.5	V
V_{OH}	$V_{CC} = 4.5$ V to 5.5 V, $I_{OH} = -0.4$ mA	$V_{CC} - 2$			$V_{CC} - 2$			V
V_{OL}	$V_{CC} = 4.5$ V		0.25	0.4		0.25	0.4	V
		$I_{OL} = 4$ mA				0.35	0.5	
I_I	$V_{CC} = 5.5$ V, $V_I = 7$ V			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5$ V, $V_I = 2.7$ V			20			20	μA
I_{IL}	$V_{CC} = 5.5$ V, $V_I = 0.4$ V			-0.1			-0.1	mA
$I_{O\#}$	$V_{CC} = 5.5$ V, $V_O = 2.25$ V	-20		-112	-30		-112	mA
I_{CCH}	$V_{CC} = 5.5$ V, $V_I = 4.5$ V		1	1.8		1	1.8	mA
I_{CCL}	$V_{CC} = 5.5$ V, $V_I = 0$		1.6	3		1.6	3	mA

† All typical values are at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$.

The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

SN54ALS11A, SN54AS11, SN74ALS11A, SN74AS11 TRIPLE 3-INPUT POSITIVE-AND GATES

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switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $C_L = 50 \text{ pF},$ $R_L = 500 \Omega,$ $T_A = \text{MIN to MAX}^\dagger$				UNIT
			SN54ALS11A		SN74ALS11A		
			MIN	MAX	MIN	MAX	
t_{PLH}	A, B, or C	Y	2	14	2	13	ns
t_{PHL}			2	12.5	2	10	

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[‡]

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Operating free-air temperature range, T_A : SN54AS11	-55°C to 125°C
SN74AS11	0°C to 70°C
Storage temperature range	-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.

recommended operating conditions

	SN54AS11			SN74AS11			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC} Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH} High-level input voltage	2			2			V
V_{IL} Low-level input voltage			0.8			0.8	V
I_{OH} High-level output current			-2			-2	mA
I_{OL} Low-level output current			20			20	mA
T_A Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS	SN54AS11			SN74AS11			UNIT
		MIN	TYP [§]	MAX	MIN	TYP [§]	MAX	
V_{IK}	$V_{CC} = 4.5 \text{ V},$ $I_I = -18 \text{ mA}$			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $I_{OH} = -2 \text{ mA}$	$V_{CC} - 2$			$V_{CC} - 2$			V
V_{OL}	$V_{CC} = 4.5 \text{ V},$ $I_{OL} = 20 \text{ mA}$		0.35	0.5		0.35	0.5	V
I_I	$V_{CC} = 5.5 \text{ V},$ $V_I = 7 \text{ V}$			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5 \text{ V},$ $V_I = 2.7 \text{ V}$			20			20	μA
I_{IL}	$V_{CC} = 5.5 \text{ V},$ $V_I = 0.4 \text{ V}$			-0.5			-0.5	mA
I_{O}^{\parallel}	$V_{CC} = 5.5 \text{ V},$ $V_O = 2.25 \text{ V}$	-30		-112	-30		-112	mA
I_{CCH}	$V_{CC} = 5.5 \text{ V},$ $V_I = 4.5 \text{ V}$		4.3	7		4.3	7	mA
I_{CCL}	$V_{CC} = 5.5 \text{ V},$ $V_I = 0$		11.2	18		11.2	18	mA

[§] All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}.$

^{||} The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, $I_{OS}.$



SN54ALS11A, SN54AS11, SN74ALS11A, SN74AS11 TRIPLE 3-INPUT POSITIVE-AND GATES

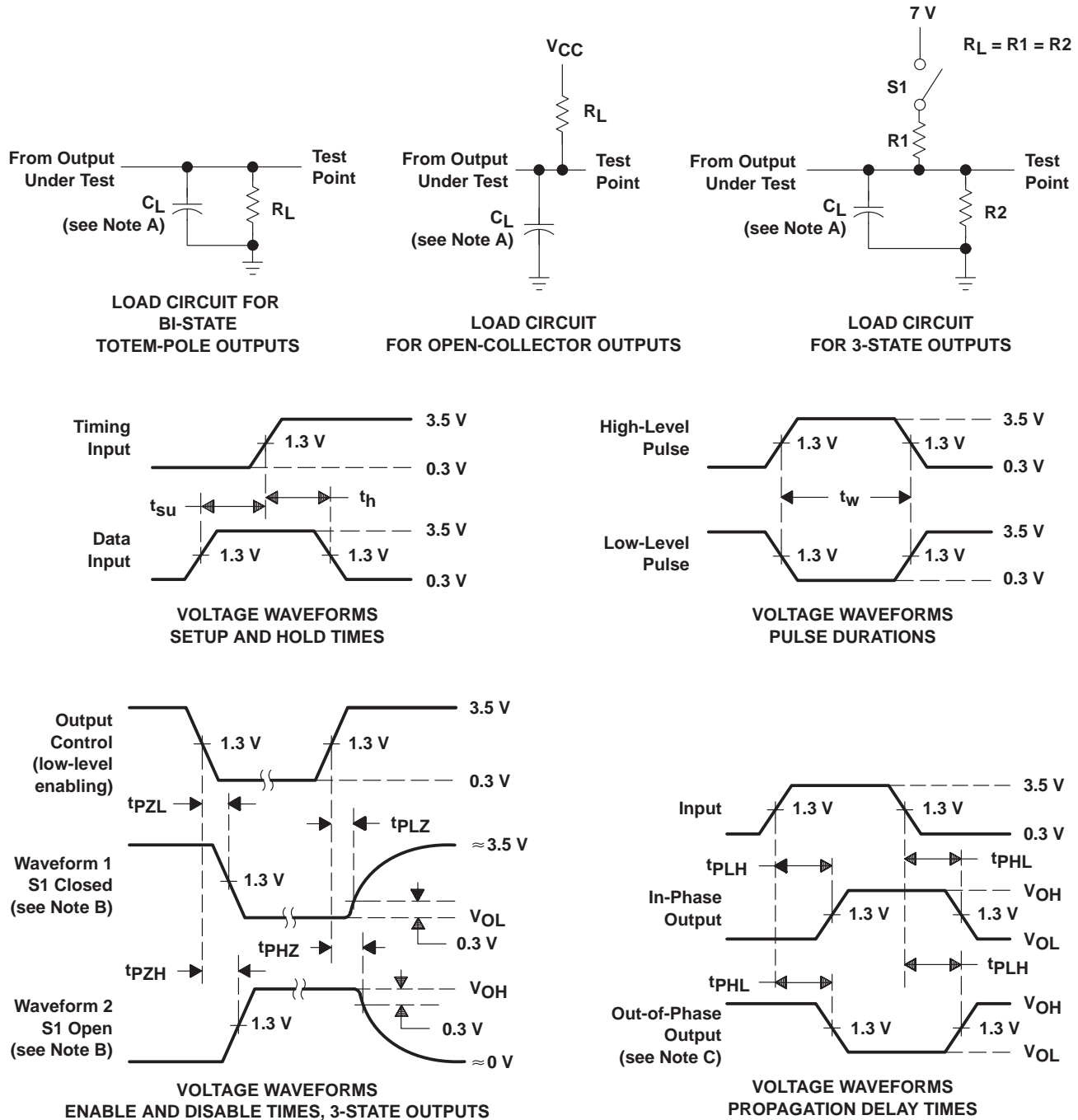
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switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $C_L = 50 \text{ pF},$ $R_L = 500 \Omega,$ $T_A = \text{MIN to MAX}^\dagger$				UNIT
			SN54AS11		SN74AS11		
			MIN	MAX	MIN	MAX	
t_{PLH}	A, B, or C	Y	1	6.5	1	6	ns
t_{PHL}			1	6.5	1	5.5	

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

PARAMETER MEASUREMENT INFORMATION
SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- NOTES: A. C_L includes probe and jig capacitance.
 B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
 C. When measuring propagation delay items of 3-state outputs, switch S1 is open.
 D. All input pulses have the following characteristics: $PRR \leq 1$ MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
 E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

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SN74AS11, Triple 3-Input Positive-AND Gates

DEVICE STATUS: **ACTIVE**

PARAMETER NAME	SN54AS11	SN74AS11
Voltage Nodes (V)	5	5
Vcc range (V)	4.5 to 5.5	4.5 to 5.5
Input Level	TTL	TTL
Output Level	TTL	TTL
Output Drive (mA)		-2/20
No. of Gates	3	3
Static Current		12.5
tpd max (ns)		6

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- Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

DESCRIPTION

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

The SN54ALS11A and SN54AS11 are characterized for operation over the full military temperature range of -55°C to 125°C. The SN74ALS11A and SN74AS11 are characterized for operation from 0°C to 70°C.

TECHNICAL DOCUMENTS

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DATASHEET

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Full datasheet in Acrobat PDF: [sn74as11.pdf](#) (95 KB, Rev.C) (Updated: 12/01/1994)

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- [Advanced Schottky \(ALS and AS\) Logic Families](#) (SDAA010 - Updated: 08/01/1995)
- [Advanced Schottky Load Management](#) (SDYA016 - Updated: 02/01/1997)
- [Designing With Logic \(Rev. C\)](#) (SDYA009C - Updated: 06/01/1997)
- [Evaluation of Nickel/Palladium/Gold-Finished Surface-Mount Integrated Circuits](#) (SZZA026 - Updated: 06/20/2001)
- [Input and Output Characteristics of Digital Integrated Circuits](#) (SDYA010 - Updated: 10/01/1996)
- [Live Insertion](#) (SDYA012 - Updated: 10/01/1996)

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- [Logic Reference Guide](#) (SCYB004, 1032 KB - Updated: 10/23/2001)
- [Logic Selection Guide Second Half 2002 \(Rev. R\)](#) (SDYU001R, 4274 KB - Updated: 07/19/2002)
- [Military Semiconductors Selection Guide 2002 \(Rev. B\)](#) (SGYC003B, 1648 KB - Updated: 04/22/2002)

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DEVICE INFORMATION							TI INVENTORY STATUS AS OF 3:00 PM GMT, 26 Sep 2002			REPORTED DISTRIBUTOR INVENTORY AS OF 3:00 PM GMT, 26 Sep 2002		
ORDERABLE DEVICE	STATUS	PACKAGE TYPE PINS	TEMP (°C)	PRODUCT CONTENT	BUDGETARY PRICING QTY SUS	STD PACK QTY	IN STOCK	IN PROGRESS QTY DATE	LEAD TIME	DISTRIBUTOR COMPANY REGION	IN STOCK	PURCHASE
SN74AS11D	ACTIVE	SOP (D) 14	0 TO 70	View Contents	1KU 0.32	50	N/A*	>10k 14 Oct	5 WKS			
								>10k 21 Oct				
SN74AS11DR	ACTIVE	SOP (D) 14	0 TO 70	View Contents	1KU 0.35	2500	1112	>10k 10 Oct	5 WKS			
								>10k 17 Oct				
SN74AS11N	ACTIVE	PDIP (N) 14	0 TO 70	View Contents	1KU 0.28	25	N/A*	180 03 Oct	5 WKS	Avnet AMERICA	311	BUY NOW
								>10k 14 Oct				
								840 16 Oct				
								1958 21 Oct				
								>10k 28 Oct				
SN74AS11NSR	ACTIVE	SOP (NS) 14		View Contents	1KU 0.28	2000	N/A*	>10k 14 Oct	5 WKS			

Table Data Updated on: 9/26/2002

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SN74ALS11A, Triple 3-Input Positive-AND Gates

DEVICE STATUS: **ACTIVE**

PARAMETER NAME	SN54ALS11A	SN74ALS11A
Voltage Nodes (V)	5	5
Vcc range (V)	4.5 to 5.5	4.5 to 5.5
Input Level	TTL	TTL
Output Level	TTL	TTL
Output Drive (mA)		-0.4/8
No. of Gates	3	3
Static Current		2.4
tpd max (ns)		13

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DATASHEET

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APPLICATION NOTES

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- [Advanced Schottky \(ALS and AS\) Logic Families \(SDAA010 - Updated: 08/01/1995\)](#)
- [Bus-Interface Devices With Output-Damping Resistors Or Reduced-Drive Outputs \(Rev. A\) \(SCBA012A - Updated: 08/01/1997\)](#)
- [Designing With Logic \(Rev. C\) \(SDYA009C - Updated: 06/01/1997\)](#)
- [Evaluation of Nickel/Palladium/Gold-Finished Surface-Mount Integrated Circuits \(SZZA026 - Updated: 06/20/2001\)](#)
- [Input and Output Characteristics of Digital Integrated Circuits \(SDYA010 - Updated: 10/01/1996\)](#)
- [Live Insertion \(SDYA012 - Updated: 10/01/1996\)](#)

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- [Logic Selection Guide Second Half 2002 \(Rev. R\) \(SDYU001R, 4274 KB - Updated: 07/19/2002\)](#)
- [Military Semiconductors Selection Guide 2002 \(Rev. B\) \(SGYC003B, 1648 KB - Updated: 04/22/2002\)](#)

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SN74ALS11AD	ACTIVE	SOP (D) 14	0 TO 70	View Contents	1KU 0.28	50	4250	1750 03 Oct	5 WKS			
SN74ALS11ADR	ACTIVE	SOP (D) 14	0 TO 70	View Contents	1KU 0.31	2500	7500	40 25 Sep	5 WKS			
SN74ALS11AN	ACTIVE	PDIP (N) 14	0 TO 70	View Contents	1KU 0.28	25	<u>N/A*</u>	1100 24 Sep	5 WKS			
								5693 04 Nov				
								> 10k 12 Nov				
								> 10k 25 Nov				
								> 10k 09 Dec				
SN74ALS11ANSR	ACTIVE	SOP (NS) 14		View Contents	1KU 0.28	2000	<u>N/A*</u>		5 WKS			

Table Data Updated on: 9/26/2002