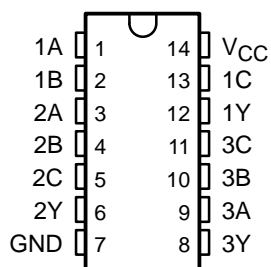


SN54ALS11A, SN54AS11, SN74ALS11A, SN74AS11 TRIPLE 3-INPUT POSITIVE-AND GATES

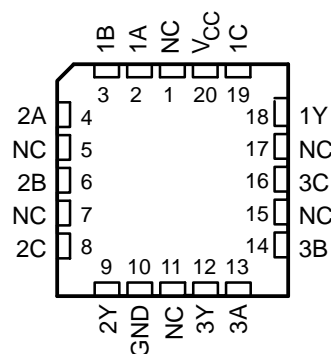
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- 4.5-V to 5.5-V V_{CC} Operation
- Max t_{pd} of 5.5 ns at 5 V

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



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



NC – No internal connection

description/ordering information

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

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING	
0°C to 70°C	PDIP – N	Tube	SN74ALS11AN	SN74ALS11AN	
			SN74AS11N	SN74AS11N	
	SOIC – D	Tube	SN74ALS11AD	ALS11A	
			Tape and reel		SN74ALS11ADR
			Tube	SN74AS11D	AS11
				Tape and reel	
SOP – NS	Tape and reel	SN74ALS11ANSR	ALS11A		
		SN74AS11NSR	74AS11		
–55°C to 125°C	CDIP – J	Tube	SNJ54ALS11AJ	SNJ54ALS11AJ	
			SNJ54AS11J	SNJ54AS11J	
	CFP – W	Tube	SNJ54ALS11AW	SNJ54ALS11AW	
			SNJ54ALS11AFK	SNJ54ALS11AFK	
LCCC – FK	Tube	SNJ54ALS11AFK	SNJ54ALS11AFK		
		SNJ54AS11FK	SNJ54AS11FK		

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

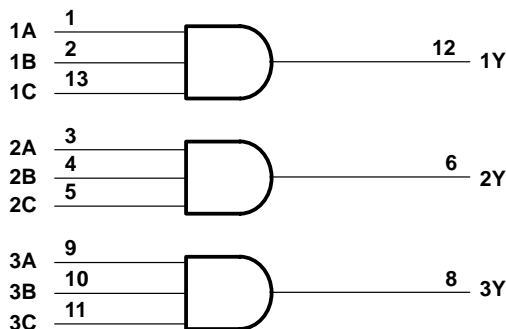
SN54ALS11A, SN54AS11, SN74ALS11A, SN74AS11 TRIPLE 3-INPUT POSITIVE-AND GATES

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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 diagram, each gate (positive logic)



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

absolute maximum ratings over operating free-air temperature range (SN54ALS11A, SN74ALS11A) (unless otherwise noted)[†]

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Package thermal impedance, θ_{JA} (see Note 1): D package	86°C/W
N package	80°C/W
NS package	76°C/W
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.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions (see Note 2)

	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

NOTE 2: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.



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

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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}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			-1.5		-1.5	V	
V_{OH}	$V_{CC} = 4.5\text{ V to } 5.5\text{ V}$, $I_{OH} = -0.4\text{ mA}$			$V_{CC} - 2$		$V_{CC} - 2$	V	
V_{OL}	$V_{CC} = 4.5\text{ V}$			0.25	0.4	0.25	0.4	V
						0.35	0.5	
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}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$				-0.1		-0.1	mA
$I_{O\ddagger}$	$V_{CC} = 5.5\text{ V}$, $V_O = 2.25\text{ V}$			-20	-112	-30	-112	mA
I_{CCH}	$V_{CC} = 5.5\text{ V}$, $V_I = 4.5\text{ V}$			1	1.8	1	1.8	mA
I_{CCL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0$			1.6	3	1.6	3	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} .

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V TO } 5.5\text{ V}$, $C_L = 50\text{ PF}$, $R_L = 500\ \Omega$, $T_A = \text{MIN TO MAX}\S$				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 (SN54AS11, SN74AS11) (unless otherwise noted)¶

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Package thermal impedance, θ_{JA} (see Note 1):	
D package	86°C/W
N package	80°C/W
NS package	76°C/W
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.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.

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

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recommended operating conditions (see Note 2)

		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			0			70	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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 V, I _I = -18 mA	-1.2			-1.2			V
V _{OH}	V _{CC} = 4.5 V to 5.5 V, I _{OH} = -2 mA	V _{CC} -2			V _{CC} -2			V
V _{OL}	V _{CC} = 4.5 V, I _{OL} = 20 mA	0.35 0.5			0.35 0.5			V
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	-0.5			-0.5			mA
I _O ‡	V _{CC} = 5.5 V, V _O = 2.25 V	-30 -112			-30 -112			mA
I _{CCH}	V _{CC} = 5.5 V, V _I = 4.5 V	4.3 7			4.3 7			mA
I _{CCL}	V _{CC} = 5.5 V, V _I = 0	11.2 18			11.2 18			mA

† All typical values are at V_{CC} = 5 V, T_A = 25°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}.

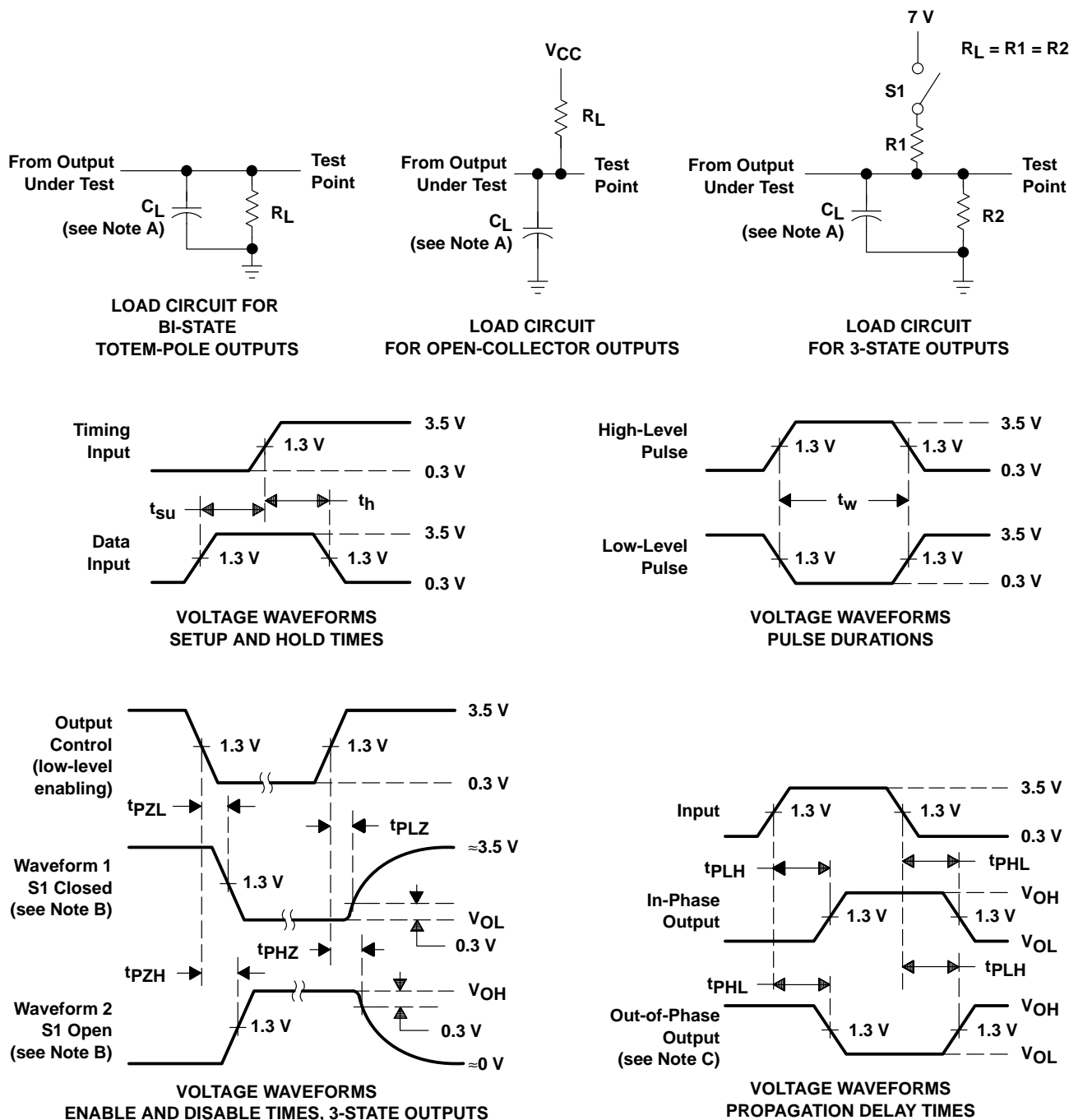
switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V TO 5.5 V, C _L = 50 PF, R _L = 500 Ω, T _A = MIN TO MAX§				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