

TYPES SN54H11, SN54LS11, SN54S11, SN74H11, SN74LS11, SN74S11 TRIPLE 3-INPUT POSITIVE-AND GATES

REVISED APRIL 1985

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

These devices contain three independent 3-input AND gates.

The SN54H11, SN54LS11, SN54S11 are characterized for operation over the full military temperature range of -55°C to 125°C. The SN74H11, SN74LS11, and SN74S11, 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 diagram (each gate)

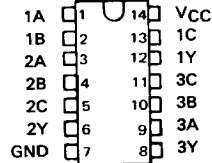


positive logic

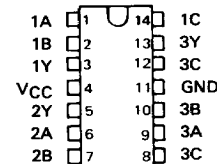
$$Y = A \cdot B \cdot C \text{ or } Y = \overline{\overline{A} + \overline{B} + \overline{C}}$$

SN54H11 ... J PACKAGE
SN54LS11, SN54S11 ... J OR W PACKAGE
SN74H11 ... J OR N PACKAGE
SN74LS11, SN74S11 ... D, J OR N PACKAGE

(TOP VIEW)

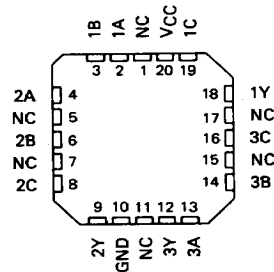


SN54H11 ... W PACKAGE
(TOP VIEW)



SN54LS11, SN54S11 ... FK PACKAGE
SN74LS11, SN74S11 ... FN PACKAGE

(TOP VIEW)



NC - No internal connection

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PRODUCTION DATA

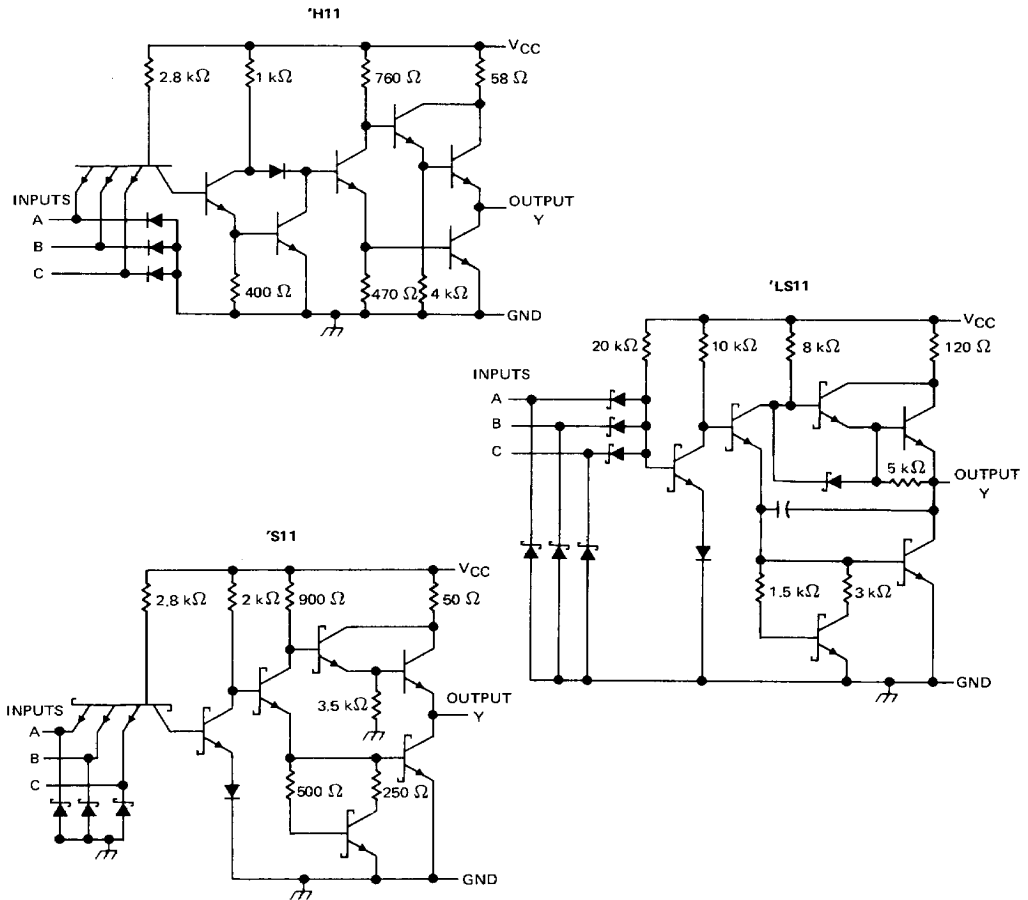
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**TYPES SN54H11, SN54LS11, SN54S11
SN74H11, SN74LS11, SN74S11
TRIPLE 3-INPUT POSITIVE-AND GATES**

schematics (each gate)



Resistor values shown are nominal.

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: 'H11, 'S11	5.5 V
'LS11	7 V
Operating free-air temperature: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

TYPES SN54H11, SN74H11 TRIPLE 3-INPUT POSITIVE-AND GATES

recommended operating conditions

	SN54H11			SN74H11			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	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			-0.5			-0.5	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 †	SN54H11		SN74H11		UNIT		
		MIN	TYP ‡	MAX	MIN		TYP ‡	MAX
V _{IK}	V _{CC} = MIN, I _I = -8 mA			-1.5		-1.5	V	
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V, I _{OH} = -0.5 mA	2.4	3.4		2.4	3.4	V	
V _{OL}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OL} = 20 mA		0.2	0.4		0.2	0.4	V
I _I	V _{CC} = MAX, V _I = 5.5 V			1		1	mA	
I _{IH}	V _{CC} = MAX, V _I = 2.4 V			50		50	µA	
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-2		-2	mA	
I _{OS} §	V _{CC} = MAX	-40		-100	-40		-100	mA
I _{CCH}	V _{CC} = MAX, V _I = 4.5 V		18	30		18	30	mA
I _{CCL}	V _{CC} = MAX, V _I = 0 V		30	48		30	48	mA

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

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

§ Not more than one output should be shorted at a time, and the duration of the output short circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	A, B or C	Y	R _L = 280 Ω, C _L = 25 pF		7.6	12	ns
t _{PHL}					8.8	12	ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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TYPES SN54LS11, SN74LS11 TRIPLE 3-INPUT POSITIVE-AND GATES

recommended operating conditions

	SN54LS11			SN74LS11			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage				0.8			V
I _{OH} High-level output current				-0.4			mA
I _{OL} Low-level output current				8			mA
T _A Operating free-air temperature	-55			125			°C

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

PARAMETER	TEST CONDITIONS †	SN54LS11		SN74LS11		UNIT
		MIN	TYP ‡	MAX	MIN	
V _{IK}	V _{CC} = MIN, I _I = -18 mA			-1.5		V
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V, I _{OH} = -0.4 mA	2.5	3.4	2.7	3.4	V
V _{OL}	V _{CC} = MIN, V _{IL} = MAX, I _{OL} = 4 mA	0.25		0.4		V
	V _{CC} = MIN, V _{IL} = MAX, I _{OL} = 8 mA			0.35		
I _I	V _{CC} = MAX, V _I = 7 V	0.1		0.1		mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V	20		20		μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V	-0.4		-0.4		mA
I _{OS} §	V _{CC} = MAX	-20	-100	-20	-100	mA
I _{CCH}	V _{CC} = MAX, V _I = 4.5 V	1.8	3.6	1.8	3.6	mA
I _{CCL}	V _{CC} = MAX, V _I = 0 V	3.3	6.6	3.3	6.6	mA

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

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

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	A, B or C	Y	R _L = 2 kΩ, C _L = 15 pF	8		15	ns
t _{PHL}				10		20	ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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TYPES SN54S11, SN74S11 TRIPLE 3-INPUT POSITIVE-AND GATES

recommended operating conditions

	SN54S11			SN74S11			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	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			-1			-1	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 †	SN54S11		SN74S11		UNIT		
		MIN	TYP ‡	MAX	MIN		TYP ‡	MAX
V _{IK}	V _{CC} = MIN, I _I = -18 mA			-1.2		-1.2	V	
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V, I _{OH} = -1 mA	2.5	3.4		2.7	3.4	V	
V _{OL}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OL} = 20 mA			0.5		0.5	V	
I _I	V _{CC} = MAX, V _I = 5.5 V			1		1	mA	
I _{IH}	V _{CC} = MAX, V _I = 2.7 V			50		50	μA	
I _{IL}	V _{CC} = MAX, V _I = 0.5 V			-2		-2	mA	
I _{OS} §	V _{CC} = MAX	-40		-100	-40	-100	mA	
I _{CCH}	V _{CC} = MAX, V _I = 4.5 V		13.5	24		13.5	24	mA
I _{CCL}	V _{CC} = MAX, V _I = 0 V		24	42		24	42	mA

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

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

§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	A, B or C	Y	R _L = 280 Ω, C _L = 15 pF		4.5	7	ns
t _{PHL}					5	7.5	ns
t _{PLH}			R _L = 280 Ω, C _L = 50 pF		6		ns
t _{PHL}					7.5		ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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