

SN54LS11, SN54S11, SN74LS11, SN74S11

TRIPLE 3-INPUT POSITIVE-AND GATES

SDLS131 – APRIL 1985 – REVISED MARCH 1988

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

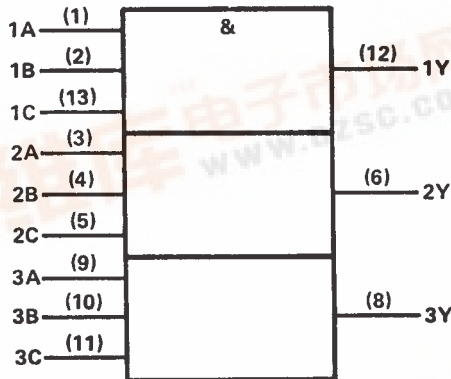
These devices contain three independent 3-input AND gates.

The SN54LS11 and SN54S11 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74LS11 and SN74S11 are characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

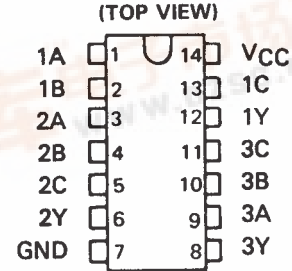
INPUTS			OUTPUT
A	B	C	Y
H	H	H	H
L	X	X	L
X	L	X	L
X	X	L	L

logic symbol†

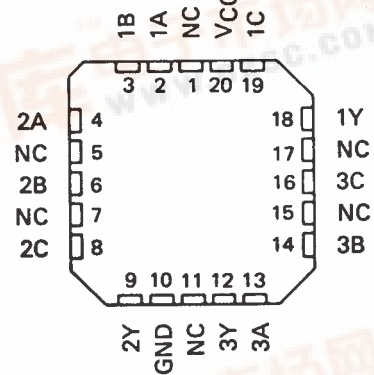


†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12. Pin numbers shown are for D, J, N, and W packages.

SN54LS11, SN74S11 . . . J OR W PACKAGE
SN74LS11, SN74S11 . . . D OR N PACKAGE

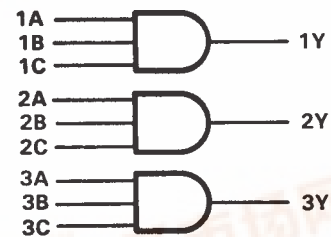


SN54LS11, SN54S11 . . . FK PACKAGE
(TOP VIEW)



NC—No internal connection

logic diagram (positive logic)



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

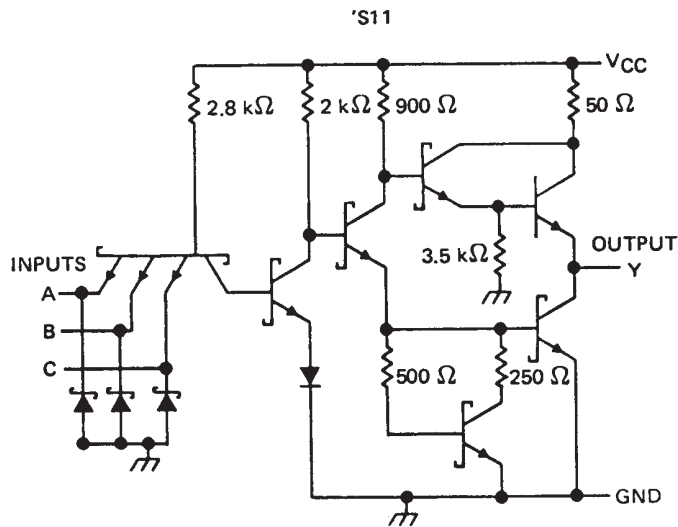
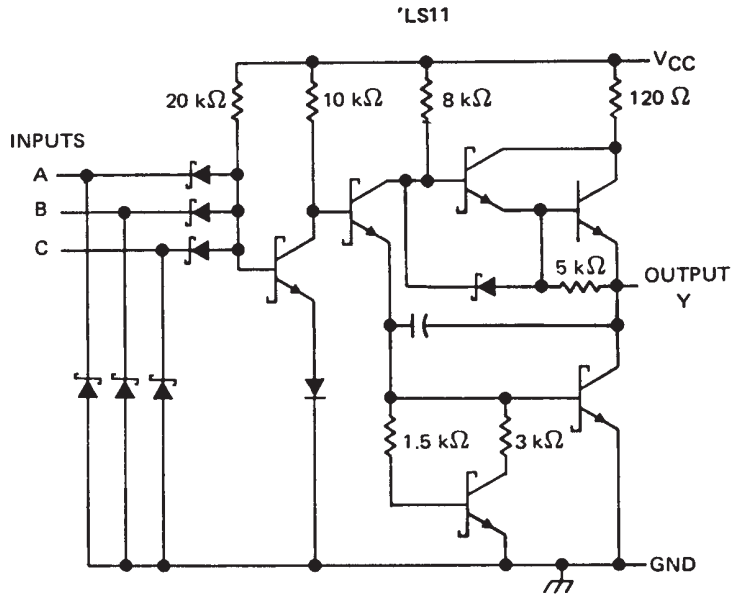
$$Y = \overline{\overline{A} + \overline{B} + \overline{C}}$$



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

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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: 'S11	5.5 V
'LS11	7 V
Operating free-air temperature range: 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.

SN54LS11, SN54S11,
SN74LS11, SN74S11
TRIPLE 3-INPUT POSITIVE-AND GATES
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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			0.7			0.8	V
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

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

PARAMETER	TEST CONDITIONS †	SN54LS11			SN74LS11			UNIT
		MIN	TYP ‡	MAX	MIN	TYP ‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = - 18 mA			- 1.5			- 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		0.25	0.4	V
	V _{CC} = MIN, V _{IL} = MAX, I _{OL} = 8 mA					0.35	0.5	
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	

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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

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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: Load circuits and voltage waveforms are shown in Section 1.

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
JM38510/08001BCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/08001BDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
JM38510/31001B2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
JM38510/31001BCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/31001BDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
SN54LS11J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN54S11J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN74LS11D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS11DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS11J	OBSOLETE	CDIP	J	14		None	Call TI	Call TI
SN74LS11N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS11N3	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN74LS11NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74S11D	OBSOLETE	SOIC	D	14		None	Call TI	Call TI
SN74S11N	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN74S11N3	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SNJ54LS11FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54LS11J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ54LS11W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
SNJ54S11FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54S11J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ54S11W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

None: Not yet available Lead (Pb-Free).

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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