- **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

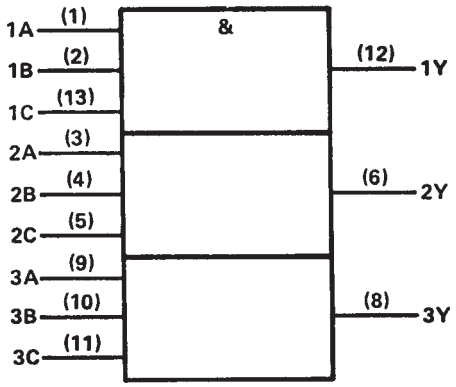
These devices contain three independent 3-input AND gates.

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)

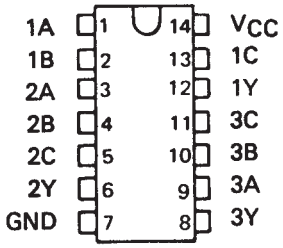
INPUTS			OUTPUT
A	B	C	Y
H	H	H	H
L	X	X	L
X	L	X	L
X	X	L	L

logic symbol†

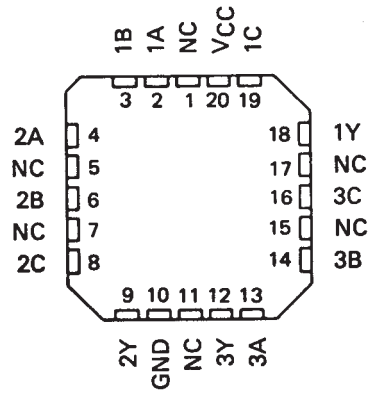


†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.
Pin numbers shown are for D, J, N, and W packages.

SN54LS11, SN74S11 . . . J OR W PACKAGE
SN74LS11, SN74S11 . . . D OR N PACKAGE
(TOP VIEW)

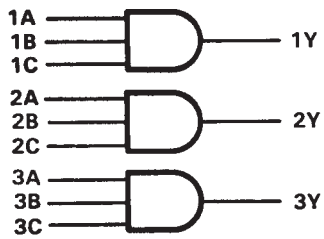


SN54LS11, SN54S11 . . . FK PACKAGE
(TOP VIEW)



NC—No internal connection

logic diagram (positive logic)

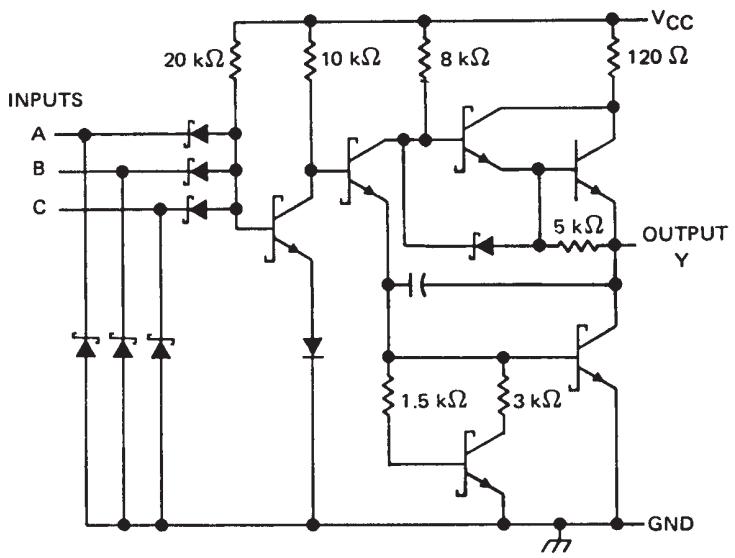


$Y = A \cdot B \cdot C$ or

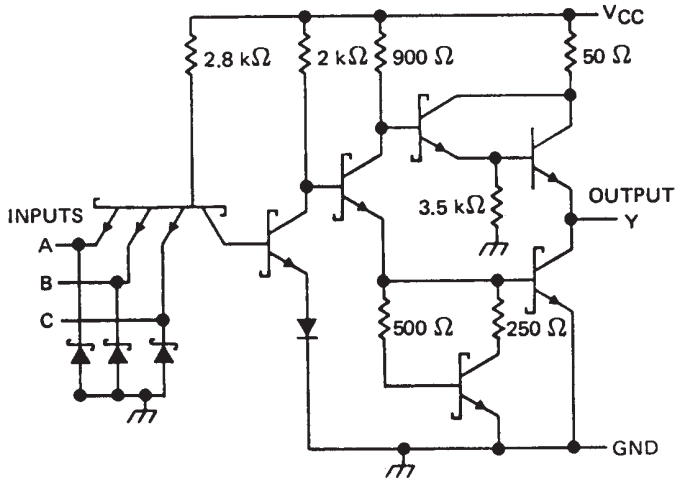
$Y = \overline{\overline{A} + \overline{B} + \overline{C}}$

schematics (each gate)

'LS11



'S11



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.

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	ns

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

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.

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