

- 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**

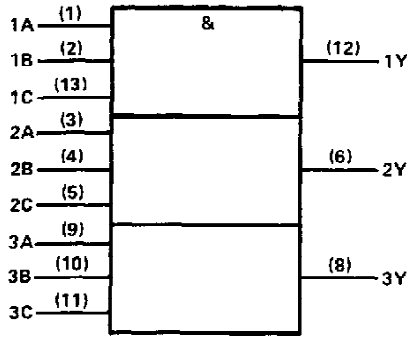
These devices contain three independent 3-input AND gates.

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)**

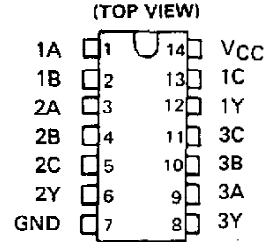
INPUTS			OUTPUT
A	B	C	Y
H	H	H	H
L	X	X	L
X	L	X	L
X	X	L	L

**logic symbol†**

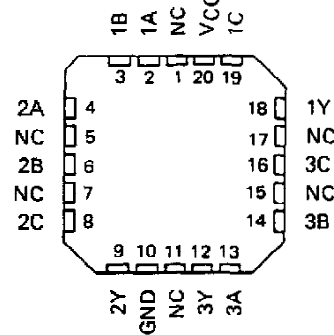


†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12. Pin numbers shown are for D, J, N, and W packages.

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

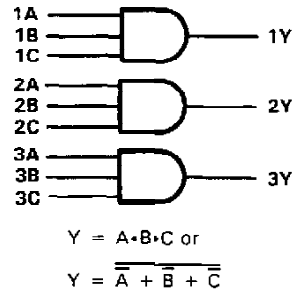


SN54LS11, SN54S11 . . . FK PACKAGE  
(TOP VIEW)



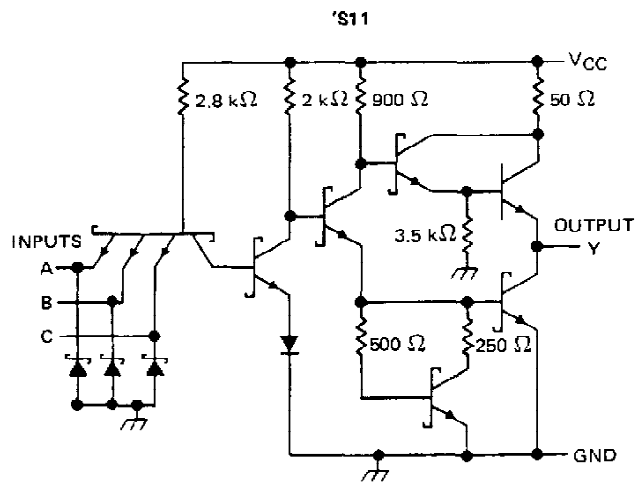
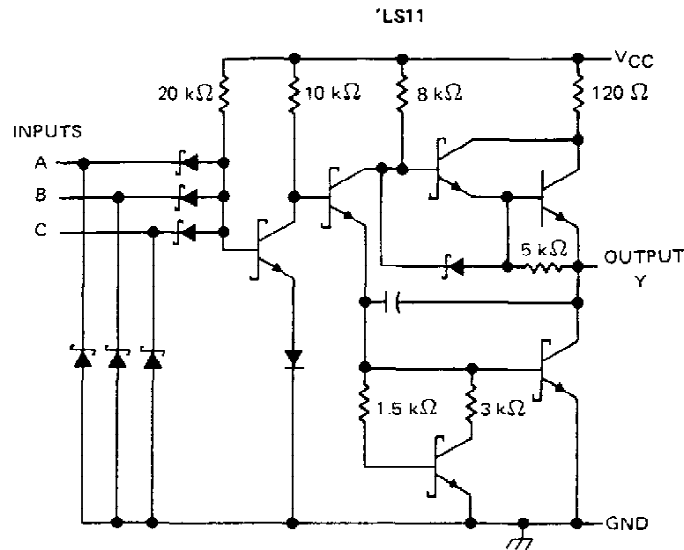
NC—No internal connection

**logic diagram (positive logic)**



**SN54LS11, SN54S11,  
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: '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.



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# 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			0.7			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	
$V_{IK}$	$V_{CC} = \text{MIN}$ , $I_I = -18 \text{ mA}$			-1.5			-1.5	V
$V_{OH}$	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $I_{OH} = -0.4 \text{ mA}$	2.5	3.4		2.7	3.4		V
$V_{OL}$	$V_{CC} = \text{MIN}$ , $V_{IL} = \text{MAX}$ , $I_{OL} = 4 \text{ mA}$		0.25	0.4		0.25	0.4	V
	$V_{CC} = \text{MIN}$ , $V_{IL} = \text{MAX}$ , $I_{OL} = 8 \text{ mA}$					0.35	0.5	
$I_I$	$V_{CC} = \text{MAX}$ , $V_I = 7 \text{ V}$			0.1			0.1	mA
$I_{IH}$	$V_{CC} = \text{MAX}$ , $V_I = 2.7 \text{ V}$			20			20	µA
$I_{IL}$	$V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$			-0.4			-0.4	mA
$I_{OS} §$	$V_{CC} = \text{MAX}$	-20		-100	-20		-100	mA
$I_{CCH}$	$V_{CC} = \text{MAX}$ , $V_I = 4.5 \text{ V}$		1.8	3.6		1.8	3.6	mA
$I_{CCL}$	$V_{CC} = \text{MAX}$ , $V_I = 0 \text{ V}$		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  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

§ 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, $V_{CC} = 5 \text{ V}$ , $T_A = 25^\circ\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$	A, B or C	Y	$R_L = 2 \text{ k}\Omega$ , $C_L = 15 \text{ pF}$		8	15	ns
$t_{PHL}$					10	20	ns

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



# 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			$^{\circ}$ 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	
$V_{IK}$	$V_{CC} = \text{MIN.}$ , $I_I = -18 \text{ mA}$	-1.2			-1.2			V
$V_{OH}$	$V_{CC} = \text{MIN.}$ , $V_{IH} = 2 \text{ V.}$ , $I_{OH} = -1 \text{ mA}$	2.5	3.4		2.7	3.4		V
$V_{OL}$	$V_{CC} = \text{MIN.}$ , $V_{IL} = 0.8 \text{ V.}$ , $I_{OL} = 20 \text{ mA}$	0.5			0.5			V
$I_I$	$V_{CC} = \text{MAX.}$ , $V_I = 5.5 \text{ V}$	1			1			mA
$I_{IH}$	$V_{CC} = \text{MAX.}$ , $V_I = 2.7 \text{ V}$	50			50			$\mu$ A
$I_{IL}$	$V_{CC} = \text{MAX.}$ , $V_I = 0.5 \text{ V}$	-2			-2			mA
$I_{OS} \S$	$V_{CC} = \text{MAX.}$	-40		-100	-40		-100	mA
$I_{CCH}$	$V_{CC} = \text{MAX.}$ , $V_I = 4.5 \text{ V}$	13.5	24		13.5	24		mA
$I_{CCL}$	$V_{CC} = \text{MAX.}$ , $V_I = 0 \text{ V}$	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  $V_{CC} = 5 \text{ V.}$ ,  $T_A = 25^{\circ}\text{C.}$

§ 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, $V_{CC} = 5 \text{ V.}$ , $T_A = 25^{\circ}\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
$t_{PLH}$	A, B or C	Y	$R_L = 280 \Omega,$ $C_L = 15 \text{ pF}$			4.5	7	ns	
$t_{PHL}$						5	7.5	ns	
$t_{PLH}$			$R_L = 280 \Omega,$ $C_L = 50 \text{ pF}$					6	ns
$t_{PHL}$								7.5	ns

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

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