

# SN54S134, SN74S134 12-INPUT POSITIVE-NAND GATES WITH 3-STATE OUTPUTS

SDLS203

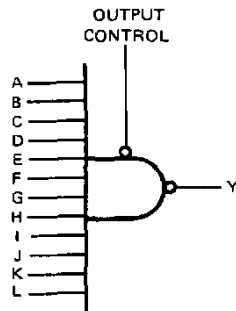
DECEMBER 1983 — REVISED MARCH 1988

- 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

The 'S134 feature three-state outputs that, when enabled, have the low impedance characteristics of a TTL output with additional drive capability at high logic levels to permit driving heavily loaded lines without external pull-up resistors. When disabled, both output transistors are turned off presenting a high-impedance state to the bus so the output will act neither as a significant load nor as a driver. The 'S134 outputs are disabled when G is high.

## logic diagram



## positive logic

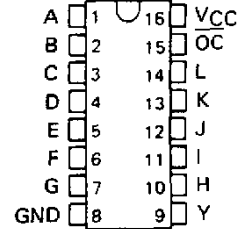
$$Y = A \cdot B \cdot C \cdot D \cdot E \cdot F \cdot G \cdot H \cdot I \cdot J \cdot K \cdot L \text{ or}$$

$$Y = \overline{A + B + C + D + E + F + G + H + I + J + K + L}$$

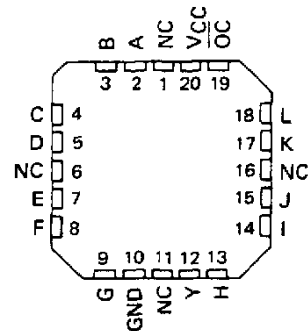
Output is off (disabled) when output control is high.

SN54S134 . . . J OR W PACKAGE  
SN74S134 . . . D OR N PACKAGE

(TOP VIEW)

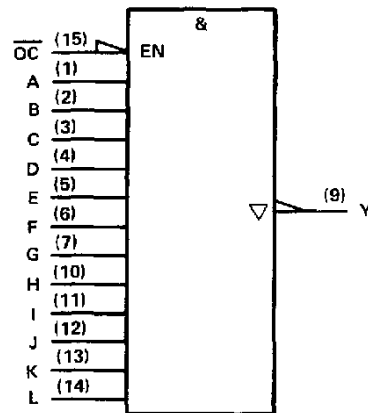


SN54S134 . . . FK PACKAGE  
(TOP VIEW)



NC - No internal connection

## 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.

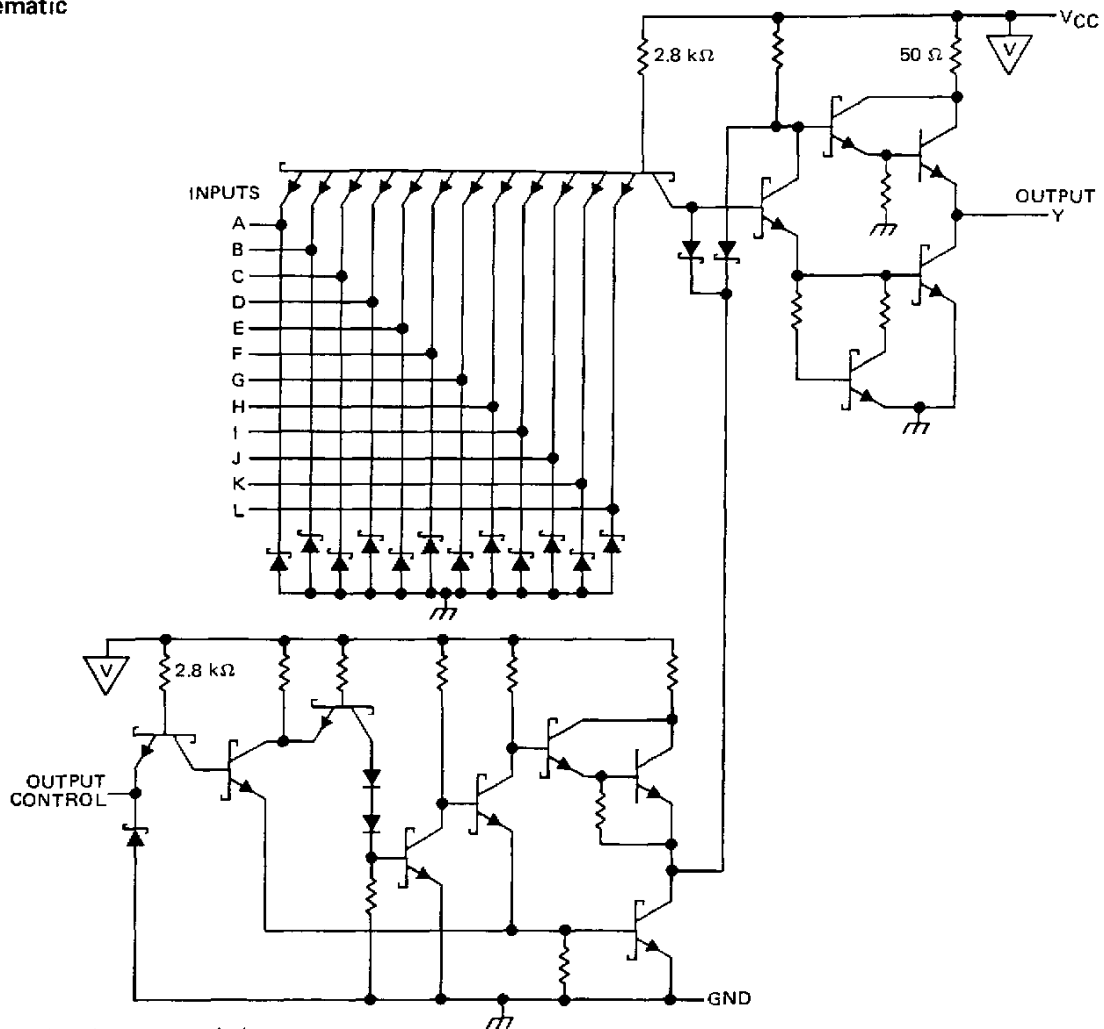
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# **SN54S134, SN74S134** **12-INPUT POSITIVE-NAND GATES WITH 3-STATE OUTPUTS**

schematic



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	5.5 V
Voltage applied to a disabled 3-state output	5.5 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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# SN54S134, SN74S134

## 12-INPUT POSITIVE-NAND GATES WITH 3-STATE OUTPUTS

### recommended operating conditions

	SN54S134			SN74S134			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			-2			-6.5	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†		SN54S134			SN74S134			UNIT
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{IK}$	$V_{CC} = \text{MIN}$ , $I_I = -18 \text{ mA}$				-1.2			-1.2	V
$V_{OH}$	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$	$I_{OH} = -2 \text{ mA}$	2.4	3.4					V
	$V_{IL} = 0.8 \text{ V}$	$I_{OH} = -6.5 \text{ mA}$				2.4	3.2		V
$V_{OL}$	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $I_{OL} = 20 \text{ mA}$	$V_{IL} = 0.8 \text{ V}$			0.5			0.5	V
$I_{OZ}$	$V_{CC} = \text{MAX}$ , $V_{IH} = 2 \text{ V}$ , $V_{IL} = 0.8 \text{ V}$	$V_O = 2.4 \text{ V}$			50			50	µA
		$V_O = 0.5 \text{ V}$			-50			-50	µA
$I_I$	$V_{CC} = \text{MAX}$ , $V_I = 5.5 \text{ V}$				1			1	mA
$I_{IH}$	$V_{CC} = \text{MAX}$ , $V_I = 2.7 \text{ V}$				50			50	µA
$I_{IL}$	$V_{CC} = \text{MAX}$ , $V_I = 0.5 \text{ V}$				-2			-2	mA
$I_{OS}§$	$V_{CC} = \text{MAX}$		-40		-100	-40		-100	mA
$I_{CC}$	$V_{CC} = \text{MAX}$	Outputs high		7	13		7	13	mA
		Outputs low		9	16		9	16	
		Outputs disabled		14	25		14	25	

† 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 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	TEST CONDITIONS	SN54S134			SN74S134			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
$t_{PLH}$	$R_L = 280 \Omega$ , $C_L = 15 \text{ pF}$		4	6		4	6	ns
$t_{PLH}$	$R_L = 280 \Omega$ , $C_L = 50 \text{ pF}$		5.5			5.5		ns
$t_{PHL}$	$R_L = 280 \Omega$ , $C_L = 15 \text{ pF}$		5	7.5		5	7.5	ns
$t_{PHL}$	$R_L = 280 \Omega$ , $C_L = 50 \text{ pF}$		7			7		ns
$t_{PZH}$	$R_L = 280 \Omega$ , $C_L = 50 \text{ pF}$		13	19.5		13	19.5	ns
$t_{PZL}$	$R_L = 280 \Omega$ , $C_L = 50 \text{ pF}$		14	21		14	21	ns
$t_{PHZ}$	$R_L = 280 \Omega$ , $C_L = 5 \text{ pF}$		5.5	8.5		5.5	8.5	ns
$t_{PLZ}$	$R_L = 280 \Omega$ , $C_L = 5 \text{ pF}$		9	14		9	14	ns

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

  
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