

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

SDLS203

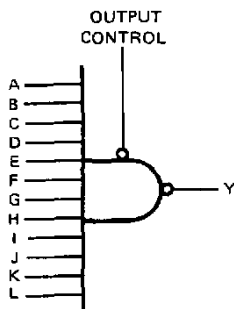
DECEMBER 1983 — REVISED MARCH 1988

- 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



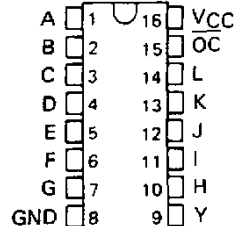
### positive logic

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

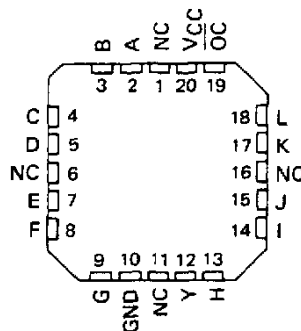
$$Y = \bar{A} + \bar{B} + \bar{C} + \bar{D} + \bar{E} + \bar{F} + \bar{G} + \bar{H} + \bar{I} + \bar{J} + \bar{K} + \bar{L}$$

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

SN54S134 . . . J OR W PACKAGE  
SN74S134 . . . D OR N PACKAGE  
(TOP VIEW)

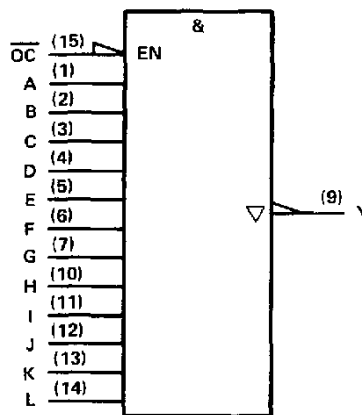


SN54S134 . . . FK PACKAGE  
(TOP VIEW)



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.

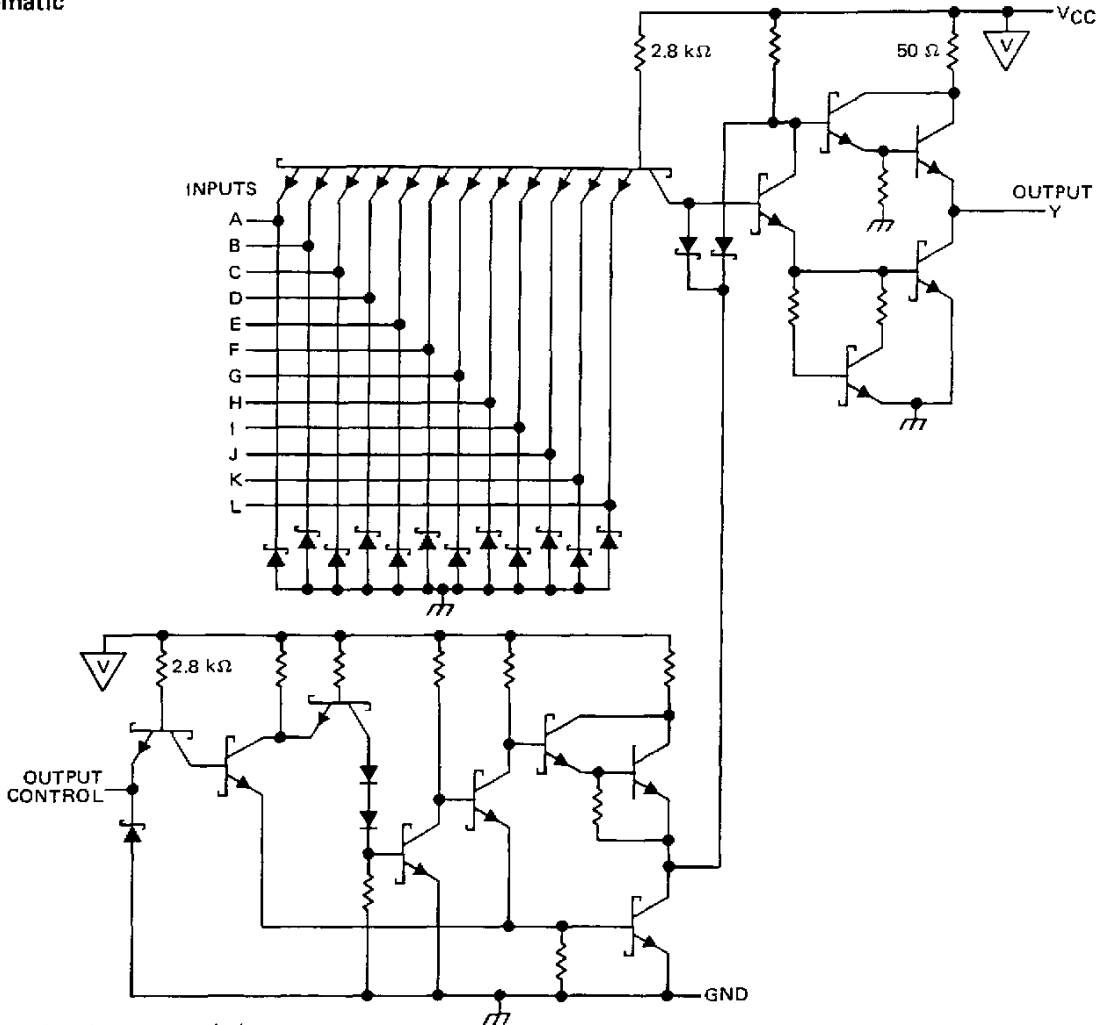
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schematic



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 <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.8			0.8	V
I <sub>OH</sub> High-level output current			-2			-6.5	mA
I <sub>OL</sub> Low-level output current			20			20	mA
T <sub>A</sub> 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‡
V <sub>IK</sub>	V <sub>CC</sub> = MIN,	I <sub>I</sub> = -18 mA			-1.2		V	
V <sub>OH</sub>	V <sub>CC</sub> = MIN,	V <sub>IH</sub> = 2 V	2.4	3.4			V	
	V <sub>IL</sub> = 0.8 V	I <sub>OH</sub> = -2 mA						
		I <sub>OH</sub> = -6.5 mA				2.4	3.2	
V <sub>OL</sub>	V <sub>CC</sub> = MIN,	V <sub>IH</sub> = 2 V,			0.5		V	
	I <sub>OL</sub> = 20 mA	V <sub>IL</sub> = 0.8 V,					0.5	
I <sub>OZ</sub>	V <sub>CC</sub> = MAX,	V <sub>IH</sub> = 2 V,			50		50	
	V <sub>IL</sub> = 0.8 V	V <sub>O</sub> = 2.4 V					-50	
		V <sub>O</sub> = 0.5 V						
I <sub>I</sub>	V <sub>CC</sub> = MAX,	V <sub>I</sub> = 5.5 V			1		1	
I <sub>IH</sub>	V <sub>CC</sub> = MAX,	V <sub>I</sub> = 2.7 V			50		50	
I <sub>IL</sub>	V <sub>CC</sub> = MAX,	V <sub>I</sub> = 0.5 V			-2		-2	
I <sub>OS</sub> §	V <sub>CC</sub> = MAX		-40		-100	-40		
I <sub>CC</sub>	V <sub>CC</sub> = MAX	Outputs high		7	13		7	13
		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<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°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<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)

PARAMETER	TEST CONDITIONS		SN54S134		SN74S134		UNIT		
			MIN	TYP	MAX	MIN		TYP	MAX
t <sub>PLH</sub>	R <sub>L</sub> = 280 Ω,	C <sub>L</sub> = 15 pF	4		6	4	6	ns	
t <sub>PLH</sub>	R <sub>L</sub> = 280 Ω,	C <sub>L</sub> = 50 pF	5.5			5.5		ns	
t <sub>PHL</sub>	R <sub>L</sub> = 280 Ω,	C <sub>L</sub> = 15 pF	5		7.5	5	7.5	ns	
t <sub>PHL</sub>	R <sub>L</sub> = 280 Ω,	C <sub>L</sub> = 50 pF	7			7		ns	
t <sub>PZH</sub>	R <sub>L</sub> = 280 Ω,	C <sub>L</sub> = 50 pF	13		19.5	13		19.5	ns
t <sub>PZL</sub>			14		21	14		21	ns
t <sub>PHZ</sub>	R <sub>L</sub> = 280 Ω,	C <sub>L</sub> = 5 pF	5.5		8.5	5.5		8.5	ns
t <sub>PLZ</sub>			9		14	9		14	ns

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

  
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