

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

SDLS203

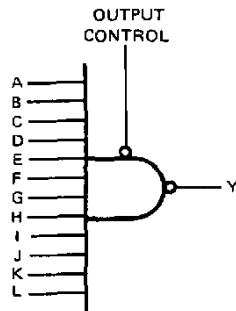
DECEMBER 1983 — REVISED MARCH 1988

- 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



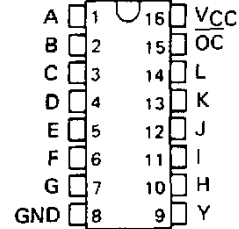
positive logic

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

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

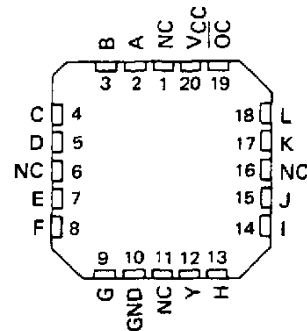
SN54S134 . . . J OR W PACKAGE
SN74S134 . . . D OR N PACKAGE

(TOP VIEW)



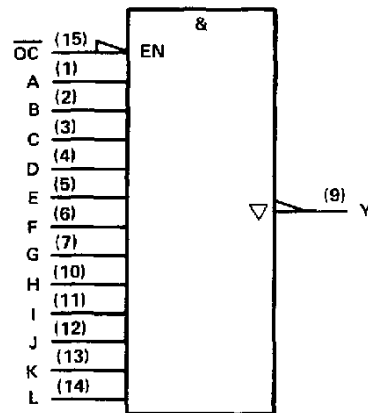
SN54S134 . . . FK PACKAGE

(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.

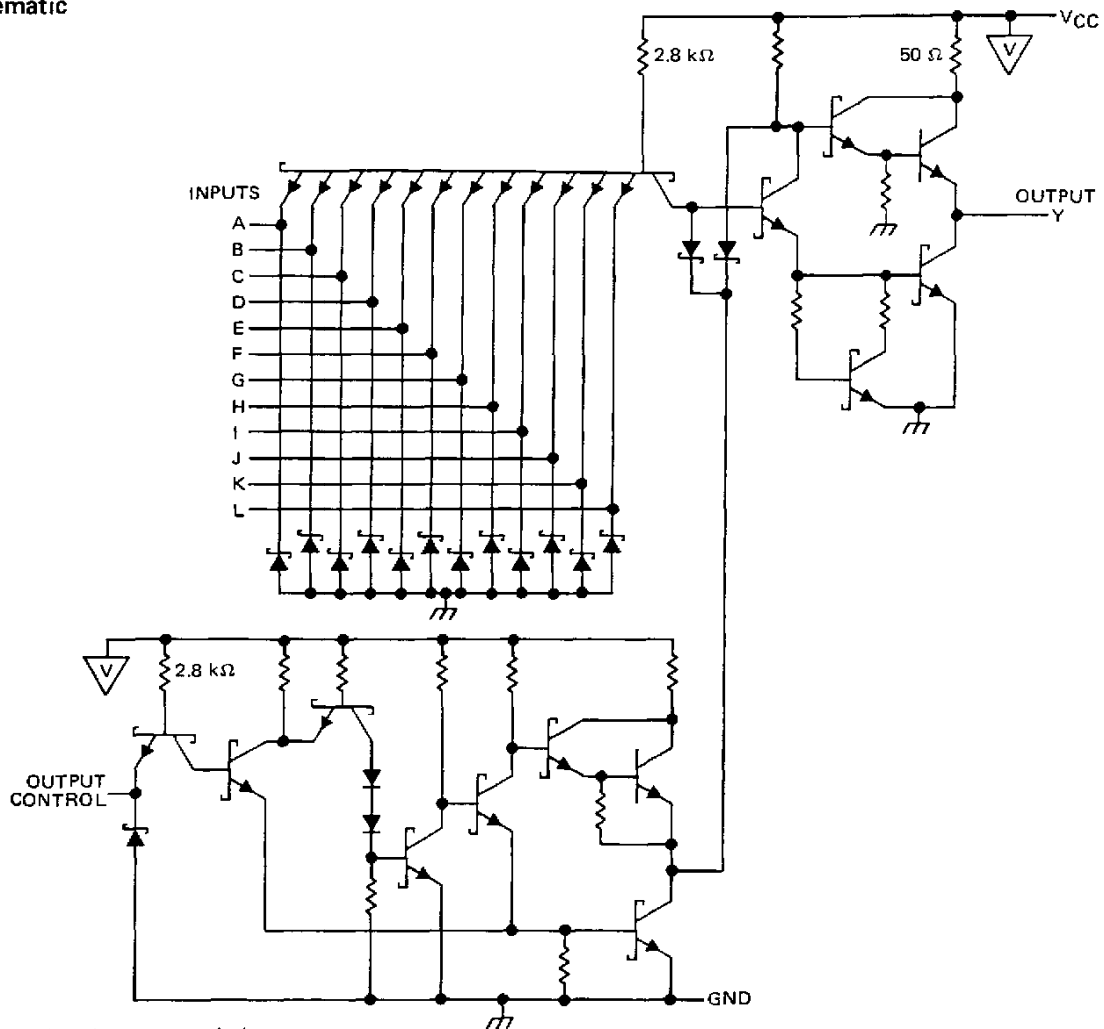
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SN54S134, SN74S134 **12-INPUT POSITIVE-NAND GATES WITH 3-STATE OUTPUTS**

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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