

# 74S134 Gate

12-Input NAND Gate (3-State)  
Product Specification

Logic Products

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT
74S134	5ns	10mA

### FUNCTION TABLE

INPUTS		OUTPUT	
D <sub>0</sub> ...D <sub>11</sub>	$\overline{OE}$	$\overline{Y}$	
H...H	L	L	
one input = L	L	H	
X...X	H	(Z)	

H = HIGH voltage level  
L = LOW voltage level  
X = Don't care  
(Z) = HIGH impedance "off" state

### ORDERING CODE

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 5\%$ ; $T_A = 0^\circ C$ to $+70^\circ C$
Plastic DIP	N74S134N
Plastic SO	N74S134D

### NOTE:

For information regarding devices processed to Military Specifications, see the Signetics Military Products Data Manual.

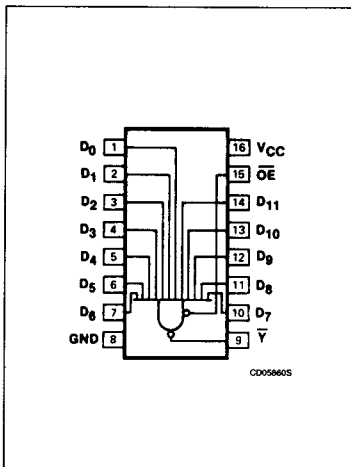
### INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74S
All	Inputs	1Sul
$\overline{Y}$	Output	10Sul

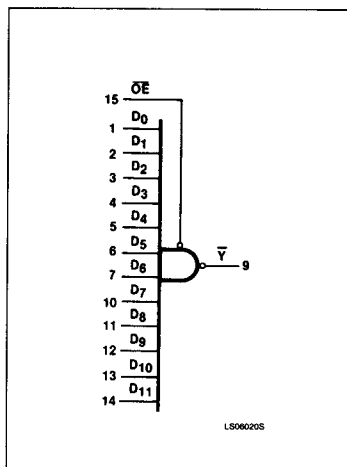
### NOTE:

Where a 74S unit load (Sul) is understood to be  $50\mu A I_{IH}$  and  $-2.0mA I_{IL}$ .

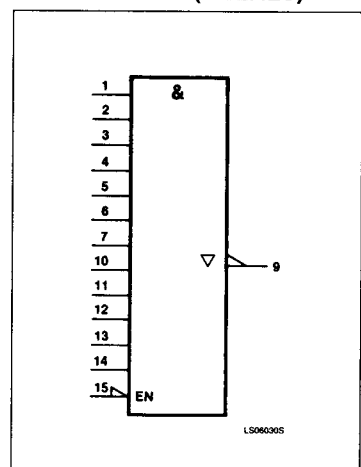
### PIN CONFIGURATION



### LOGIC SYMBOL



### LOGIC SYMBOL (IEEE/IEC)



# Gate

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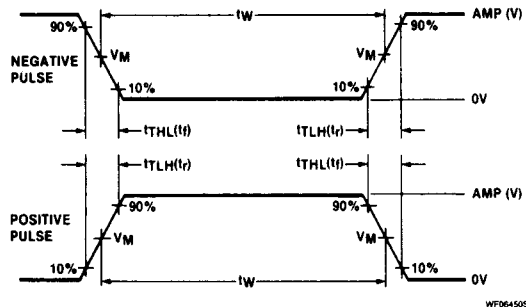
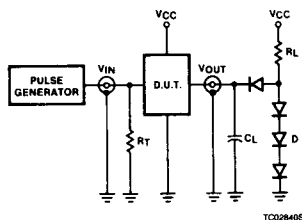
### ABSOLUTE MAXIMUM RATINGS (Over operating free-air temperature range unless otherwise noted.)

PARAMETER		74S	UNIT
V <sub>CC</sub>	Supply voltage	7.0	V
V <sub>IN</sub>	Input voltage	-0.5 to +5.5	V
I <sub>IN</sub>	Input current	-30 to +5	mA
V <sub>OUT</sub>	Voltage applied to output in HIGH output state	-0.5 to +V <sub>CC</sub>	V
T <sub>A</sub>	Operating free-air temperature range	0 to 70	°C

### RECOMMENDED OPERATING CONDITIONS

PARAMETER	74S			UNIT
	Min	Nom	Max	
V <sub>CC</sub>	4.75	5.0	5.25	V
V <sub>IH</sub>	2.0			V
V <sub>IL</sub>			+0.8	V
I <sub>IK</sub>			-18	mA
I <sub>OH</sub>			-6.5	μA
I <sub>OL</sub>			20	mA
T <sub>A</sub>	0		70	°C

### TEST CIRCUITS AND WAVEFORMS



V<sub>M</sub> = 1.3V for 74LS; V<sub>M</sub> = 1.5V for all other TTL families.

#### Test Circuit For 74 Totem-Pole Outputs

#### DEFINITIONS

R<sub>L</sub> = Load resistor to V<sub>CC</sub>; see AC CHARACTERISTICS for value.

C<sub>L</sub> = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.

R<sub>T</sub> = Termination resistance should be equal to Z<sub>OUT</sub> of Pulse Generators.

D = Diodes are 1N916, 1N3064, or equivalent.

t<sub>TLH</sub>, t<sub>THL</sub> Values should be less than or equal to the table entries.

#### Input Pulse Definition

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	Pulse Width	t <sub>TLH</sub>	t <sub>THL</sub>
74	3.0V	1MHz	500ns	7ns	7ns
74LS	3.0V	1MHz	500ns	15ns	6ns
74S	3.0V	1MHz	500ns	2.5ns	2.5ns

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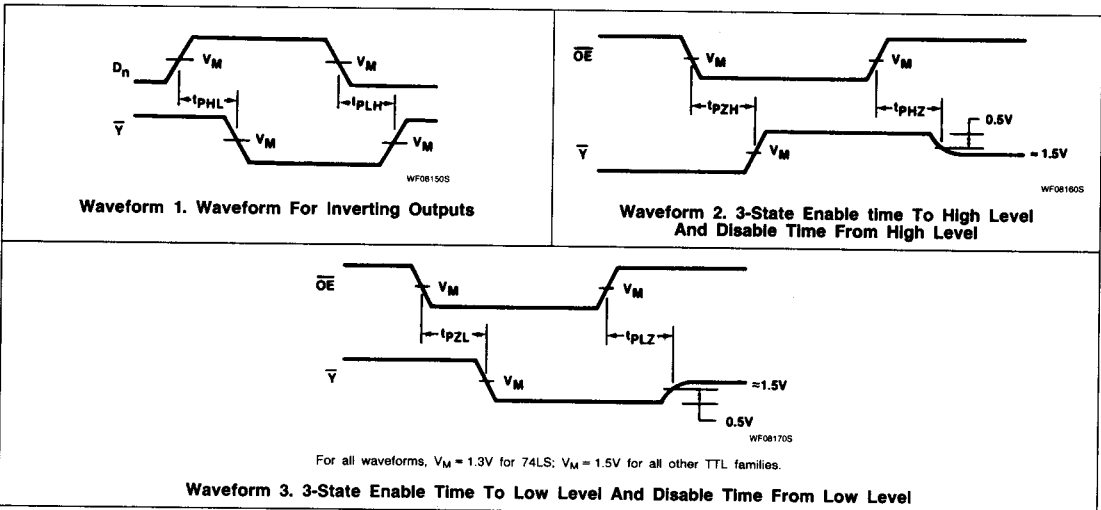
## DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

PARAMETER		TEST CONDITIONS <sup>1</sup>		74S134			UNIT	
				Min	Typ <sup>2</sup>	Max		
V <sub>OH</sub>	HIGH-level output voltage	V <sub>CC</sub> = MIN, V <sub>IH</sub> = MIN, V <sub>IL</sub> = MAX	I <sub>OH</sub> = -2mA	2.4	3.2		V	
			I <sub>OH</sub> = -6.5mA					
V <sub>OL</sub>	LOW-level output voltage	V <sub>CC</sub> = MIN, V <sub>IH</sub> = MIN, V <sub>IL</sub> = MAX, I <sub>OL</sub> = MAX				0.5	V	
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>				-1.2	V	
I <sub>OZH</sub>	Off-state output current, HIGH-level voltage applied	V <sub>CC</sub> = MAX, V <sub>IH</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>O</sub> = 2.4V				50	μA	
I <sub>OZL</sub>	Off-state output current, LOW-level voltage applied	V <sub>CC</sub> = MAX, V <sub>IH</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>O</sub> = 0.5V				-50	μA	
I <sub>I</sub>	Input current at maximum input voltage	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5V				1.0	mA	
I <sub>IH</sub>	HIGH-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7V				50	μA	
I <sub>IL</sub>	LOW-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5V				-2	mA	
I <sub>OS</sub>	Short-circuit output current <sup>3</sup>	V <sub>CC</sub> = MAX				-40	mA	
I <sub>CC</sub>	Supply current (total)	V <sub>CC</sub> = MAX	I <sub>CCH</sub> Outputs HIGH			7	13	mA
			I <sub>CCL</sub> Outputs LOW			9	16	mA
			I <sub>CCZ</sub> Outputs OFF			14	25	mA

**NOTES:**

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.
- I<sub>OS</sub> is tested with V<sub>OUT</sub> = +0.5V and V<sub>CC</sub> = V<sub>CC</sub> MAX + 0.5V. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.

## AC WAVEFORMS



## Gate

74S134

**AC ELECTRICAL CHARACTERISTICS**  $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 5.0\text{V}$ 

PARAMETER	TEST CONDITIONS	74S		UNIT
		$C_L = 15\text{pF}$ , $R_L = 280\Omega$		
		Min	Max	
$t_{PLH}$	Propagation delay	Waveform 1	6.0	ns
$t_{PHL}$	Propagation delay	Waveform 1	7.5	ns
$t_{pZH}$	Enable to HIGH	Waveform 2, $C_L = 50\text{pF}$	19.5	ns
$t_{pZL}$	Enable to LOW	Waveform 3, $C_L = 50\text{pF}$	21	ns
$t_{pHZ}$	Disable from HIGH	Waveform 2, $C_L = 5\text{pF}$	8.5	ns
$t_{pLZ}$	Disable from LOW	Waveform 3, $C_L = 5\text{pF}$	14	ns

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