Signetics

74S133
Gate

13-Input NAND Gate
Product Specification

Logic Products

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL [illegible] CURRENT
74S133	4ns	[illegible]mA

FUNCTION TABLE

INPUTS	OUTPUT
A ... M	$\overline{Y}$
H ... H one input = L	L H

H = HIGH voltage level
L = LOW voltage level

ORDERING CODE

PACKAGES	[illegible] V_{CC} = 5[illegible] TA [illegible] +70°C
Plastic DIP	[illegible]133[illegible]
Plastic SO	N74[illegible]133D

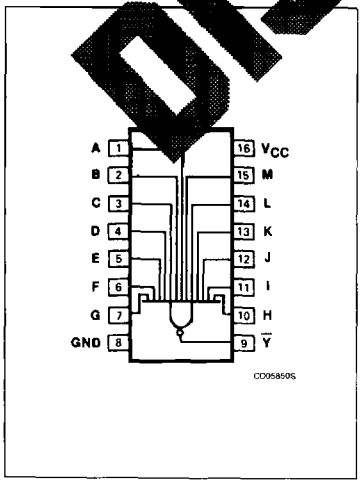
NOTE:
For information regarding devices pro[illegible]ecifications, see the Signetics Military Products Data Manual.

INPUT AND OUTP[illegible] LO[illegible]ND FAN-OUT TABLE

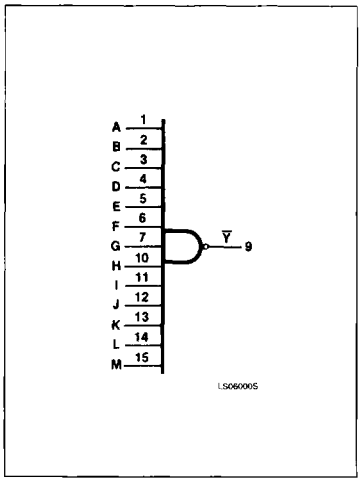
PINS	DESCRIPTION	74S
A[illegible]	Inputs	1Sul
$\overline{Y}$	Output	10Sul

NOTE:
A 74S unit[illegible]stood to be 50μA I_{IH} and −2.0mA I_{IL}.

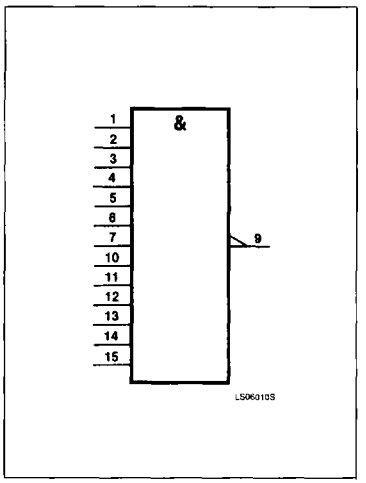
PIN CONFIGURA[illegible]N



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



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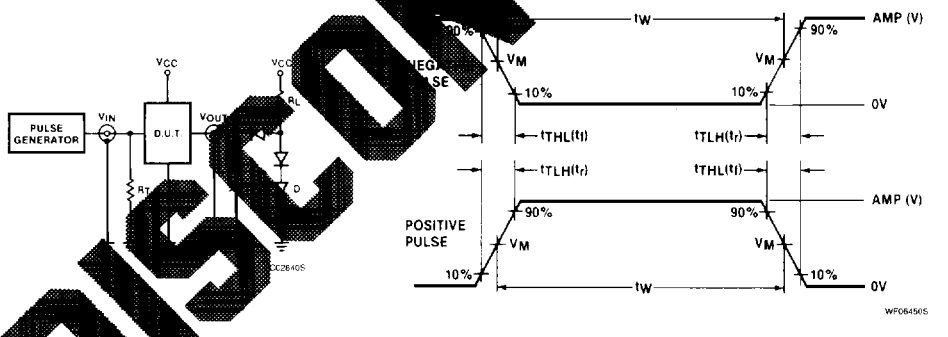
ABSOLUTE MAXIMUM RATINGS (Over operating free-air temperature range unless otherwise noted.)

PARAMETER		74S	UNIT
V_{CC}	Supply voltage	7.0	V
V_{IN}	Input voltage	−0.5 to +5.5	V
I_{IN}	Input current	−30 to +5	mA
V_{OUT}	Voltage applied to output in HIGH output state	−0.5 to +V_{CC}	V
T_A	Operating free-air temperature range	0 to 70	

RECOMMENDED OPERATING CONDITIONS

PARAMETER					UNIT
		Min	Nom	Max	
V_{CC}	Supply voltage	4.75	5.0	5.25	V
V_{IH}	HIGH-level input voltage	2.0			V
V_{IL}	LOW-level input voltage			+0.8	V
I_{IK}	Input clamp current			−18	mA
I_{OH}	HIGH-level output current			−1000	μA
I_{OL}	LOW-level output current			20	mA
T_A	Operating free-air temperature	0		70	°C

TEST CIRCUITS AND WAVEFORMS



V_M = 1.3V for 74LS; V_M = 1.5V for all other TTL families.

Test Circuit for 74 Totem-Pole Outputs

Input Pulse Definition

DEFINITIONS:
R_L = Load resistor to V_{CC}; see AC CHARACTERISTICS for value.
C_L = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.
R_T = Termination resistance should be equal to Z_{OUT} of Pulse Generators.
D = Diodes are 1N916, 1N3064, or equivalent.
t_{TLH}, t_{THL} Values should be less than or equal to the table entries.

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	Pulse Width	t_{TLH}	t_{THL}
74	3.0V	1MHz	500ns	7ns	7ns
74LS	3.0V	1MHz	500ns	15ns	6ns
74S	3.0V	1MHz	500ns	2.5ns	2.5ns

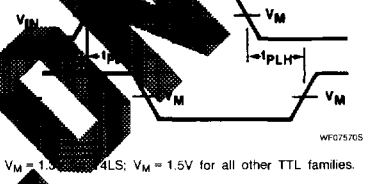
DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

PARAMETER		TEST CONDITIONS[1]		74S133			UNIT
				Min	Typ[2]	Max	
V_{OH}	HIGH-level output voltage	V_{CC} = MIN, V_{IL} = MAX, I_{OH} = MAX		2.7	3.4		V
V_{OL}	LOW-level output voltage	V_{CC} = MIN, V_{IH} = MIN, I_{OL} = MAX					V
V_{IK}	Input clamp voltage	V_{CC} = MIN, I_I = I_{IK}				-1.2	V
I_I	Input current at maximum input voltage	V_{CC} = MAX, V_I = 5.5V					mA
I_{IH}	HIGH-level input current	V_{CC} = MAX, V_I = 2.7V				50	µA
I_{IL}	LOW-level input current	V_{CC} = MAX, V_I = 0.5V				-2	mA
I_{OS}	Short-circuit output current[3]	V_{CC} = MAX		-40		-100	mA
I_{CC}	Supply current (total)	V_{CC} = MAX	I_{CCH} Outputs H			5	mA
			I_{CCL} O L		5.5	10	mA

NOTES:

1. For conditions shown as MIN or MAX, use the appropriate value specified under r ditions for the applicable type.
2. All typical values are at V_{CC} = 5V, T_A = 25°C.
3. I_{OS} is tested with V_{OUT} = +0.5V and V_{CC} = V_{CC} MAX + 0.5V. Not more than o put sho t a time and duration of the short circuit should not exceed one second.

AC WAVEFORM



V_M = 1.3 4LS; V_M = 1.5V for all other TTL families.

Wa rm 1. Waveform For Inverting Outputs

AC ELECTRIC STICS T_A = 25°C, V_{CC} = 5.0V

	TEST CONDITIONS	74LS		UNIT
		C_L = 15pF, R_L = 280Ω		
		Min	Max	
t_{PLH} t_{PHL}	gation delay	Waveform 1	6.0 7.0	ns