

74S140 Line Driver

Dual Four-Input NAND 50-Ohm Line Driver
Product Specification

Logic Products

FUNCTION TABLE

INPUTS				OUTPUT
A	B	C	D	\bar{Y}
X	X	X	L	H
X	X	L	X	H
X	L	X	X	H
L	X	X	X	H
H	H	H	H	L

H = HIGH voltage level
L = LOW voltage level
X = Don't care

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74S140	4ns	10mA (I_{CCH}) 25mA (I_{CCL})

ORDERING CODE

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 5\%$; $T_A = 0^\circ C$ to $+70^\circ C$
Plastic DIP	N74S140N

NOTE:

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

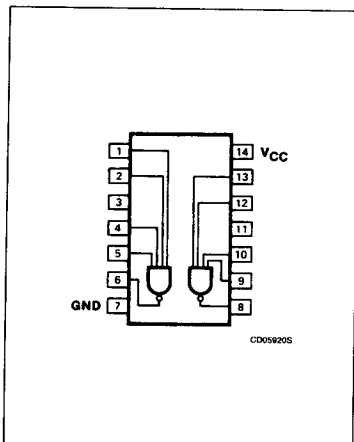
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74S
A - D	Inputs	25Sul
\bar{Y}	Output	30Sul

NOTE:

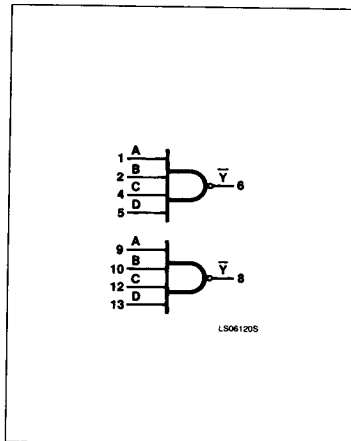
Where a 74S unit load (Sul) is $50\mu A$ I_{IH} and $-2.0mA$ I_{IL} .

PIN CONFIGURATION



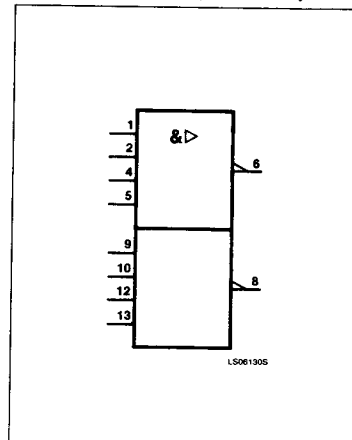
December 4, 1985

LOGIC SYMBOL



5-238

LOGIC SYMBOL (IEEE/IEC)



853-0494 81502

Line Driver

74S140

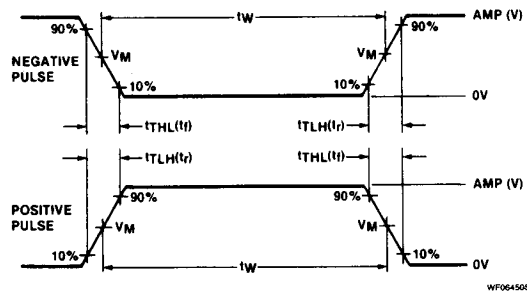
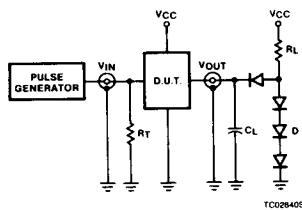
ABSOLUTE MAXIMUM RATINGS (Over operating free-air temperature range unless otherwise noted.)

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	°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	74S			UNIT
	Min	Nom	Max	
V _{CC}	4.75	5.0	5.25	V
V _{IH}	2.0			V
V _{IL}			+0.8	V
I _{IK}			-18	mA
I _{OH}			-40	mA
I _{OL}			60	mA
T _A	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

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.

Input Pulse Definition

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

Line Driver

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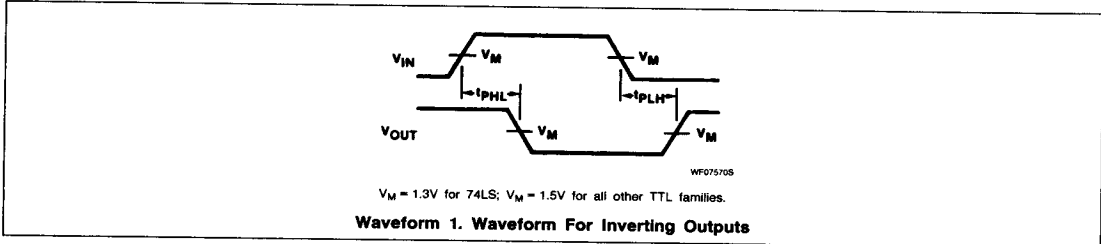
DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

PARAMETER	TEST CONDITIONS ¹	74S140			UNIT	
		Min	Typ ²	Max		
V _{OH} HIGH-level output voltage	V _{CC} = MIN, V _{IL} = MAX, I _{OH} = -3mA	2.7	3.4		V	
	V _{CC} = MIN, V _{IL} = 0.5V, R ₀ = 50Ω to ground	2.0			V	
V _{OL} LOW-level output voltage	V _{CC} = MIN, V _{IH} = MIN, I _{OL} = MAX			0.5	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			1.0	mA	
I _{IH} HIGH-level input current	V _{CC} = MAX, V _I = 2.7V			100	μA	
I _{IL} LOW-level input current	V _{CC} = MAX, V _I = 0.5V			-4	mA	
I _{OS} Short-circuit output current ³	V _{CC} = MAX	-50		-225	mA	
I _{CC} Supply current (total)	V _{CC} = MAX	I _{CCH} Outputs HIGH		10	18	mA
		I _{CCL} Outputs LOW		25	44	mA

NOTES:

1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions 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 one output should be shorted at a time and duration of the short circuit should not exceed 100 milliseconds.

AC WAVEFORM



AC ELECTRICAL CHARACTERISTICS T_A = 25°C, V_{CC} = 5.0V

PARAMETER	TEST CONDITIONS	74S		UNIT	
		C _L = 50pF, R _L = 93Ω			
		Min	Max		
t _{PLH} t _{PHL}	Propagation delay	Waveform 1		6.5 6.5	ns