Signetics

Military Logic Products

54S140
Line Driver

Dual Four-Input NAND 50Ω Line Driver

Product Specification

FUNCTION TABLE

INPUTS				OUTPUT
A	B	C	D	$\overline{Y}$
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

ORDERING INFORMATION

DESCRIPTION	ORDER CODE
Ceramic DIP	54S140/BCA
Ceramic Flat Pack	54S140/BDA
Ceramic LLCC	54S140/B2A

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

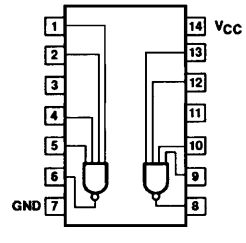
PINS	DESCRIPTION	54S
A - D	Inputs	2SUL
$\overline{Y}$	Output	30SUL

NOTE: Where a 54S Unit Load (SUL) is 50μA I_{IH} and -2.0mA I_{IL}.

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

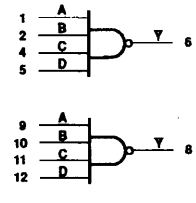
SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	7.0	V
V_I	Input voltage range	-0.5 to +5.5	V
I_I	Input current range	-30 to +5	mA
V_O	Voltage applied to output in High output state range	-0.5 to +V_{CC}	V
T_{STG}	Storage temperature range	-65 to +150	°C

PIN CONFIGURATION



For LLCC pin assignments, see JEDEC Standard No. 2

LOGIC SYMBOL



For LLCC pin assignments, see JEDEC Standard No. 2

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER		LIMITS			UNIT
			Min	Nom	Max	
V_{CC}	Supply voltage		4.5	5.0	5.5	V
V_{IH}	High-level input voltage		2.0			V
V_{IL}	Low-level input voltage				+0.8	V
		+125°C			+0.7	V
I_{IK}	Input clamp current				-18	mA
I_{OH}	High-level output current				-40	mA
I_{OL}	Low-level output current				60	mA
T_A	Operating free-air temperature range		-55		+125	°C

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

SYMBOL	PARAMETER	TEST CONDITIONS[1]		LIMITS			UNIT
				Min	Typ[2]	Max	
V_{OH}	High-level output voltage	V_{CC} = Min, V_{IL} = Max, I_{OH} = -3mA		2.5	3.4		V
		V_{CC} = Min, V_{IL} = 0.5V, R_O = 50Ω to ground		2.0			V
V_{OL}	Low-level output voltage	V_{CC} = Min, V_{IH} = Min,				0.5	V
		I_O = Max	+125°C			0.45	V
V_{IK}	Input clamp voltage	V_{CC} = Min, I_I = I_{IK}				-1.2	V
I_{IH2}	Input current at maximum input voltage	V_{CC} = Max, V_I = 5.5V				1.0	mA
I_{IH1}	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

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

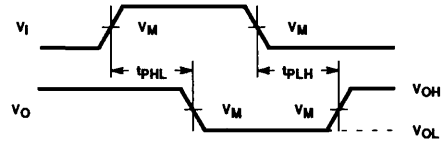
SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS		UNIT
			C_L = 50pF		
			Min	Max	
t_{PLH} t_{PHL}	Propagation delay	Waveform 1		6.5 6.5	ns ns

AC ELECTRICAL CHARACTERISTICS T_A = -55°C and +125°C, V_{CC} = 5.0V[4]

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS		UNIT
			C_L = 50pF		
			Min	Max	
t_{PLH} t_{PHL}	Propagation delay	Waveform 1		8.5 8.5	ns ns

NOTES:
1. For conditions shown as Min or Max, use the appropriate value specified under recommended operating conditions for the applicable type and function table operating mode.
2. All typical values are at V_{CC} = 5V, T_A = 25°C.
3. Not more than one output should be shorted at a time and duration of the short circuit should not exceed 100 milliseconds.
4. These parameters are guaranteed, but not tested.

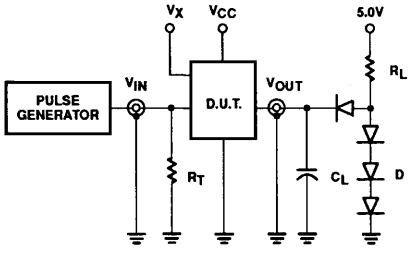
AC WAVEFORM



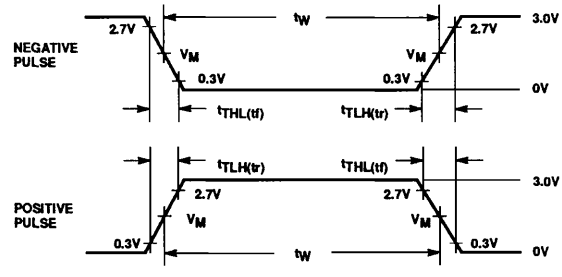
Waveform 1. Waveform for Inverting Outputs

NOTE: V_M = 1.5V

TEST CIRCUIT AND WAVEFORM



Test Circuit for 54 Totem-Pole Outputs



Input Pulse Definition

FAMILY	INPUT PULSE CHARACTERISTICS					
	R_L	V_M	Rep. Rate	T_W	T_{TLH}	T_{THL}
54SXXX	93Ω	1.5V	1MHz	500ns	≤2.5ns	≤2.5ns

DEFINITIONS:

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.
V_X = Unclocked pins must be held at ≤0.8V, ≥2.7V or open per FunctionTable.