Signetics

74S135
Gate

Quad Exclusive OR/NOR Gate
Product Specification

Logic Products

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74S135	9ns	65mA

FUNCTION TABLE

INPUTS			OUTPUT
A	B	C	Y
L	L	L	L
L	H	L	H
H	L	L	H
H	H	L	L
L	L	H	H
L	H	H	L
H	L	H	L
H	H	H	H

H = HIGH voltage level
L = LOW voltage level

ORDERING CODE

PACKAGES	COMMERCIAL RANGE V_{CC} = 5V ±5%; T_A = 0°C to +70°C
Plastic DIP	N74S135N

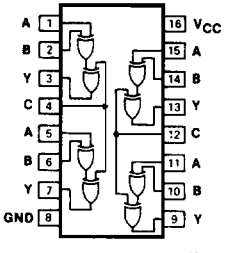
NOTE:
For information regarding devices processed to Military Specifications, see the Signetics Military Products Data Manual.

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

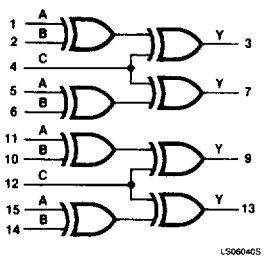
PINS	DESCRIPTION	74S
All	Inputs	1Sul
All	Outputs	10Sul

NOTE:
A 74S unit load (Sul) is understood to be 50μA I_{IH} and −2.0mA I_{IL}.

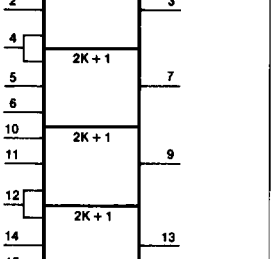
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



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}	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

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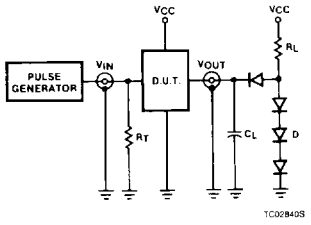
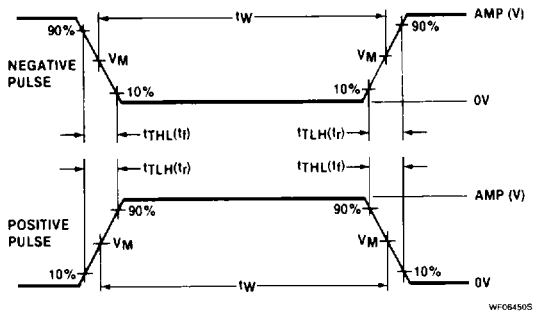
TEST CIRCUITS AND WAVEFORMS





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.

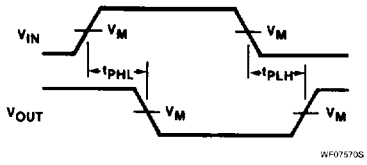
FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	Pulse Width	t_{TLH}	t_{THL}
74	3.0V	1MHz	500ns	7ns	7ns
74LS	3.0V	1MHz	500ns	15ns	6ns
74S	3.0V	1MHz	500ns	2.5ns	2.5ns

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

PARAMETER		TEST CONDITIONS[1]	74S135			UNIT
			Min	Typ[2]	Max	
V_{OH}	HIGH-level output voltage	V_{CC} = MIN, V_{IH} = MIN, V_{IL} = MAX, I_{OH} = MAX	2.7	3.4		V
V_{OL}	LOW-level output voltage	V_{CC} = MIN, V_{IH} = MIN, V_{IL} = MAX, 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			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[4] (total)	V_{CC} = MAX		65	99	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 one second.
4. Measure I_{CC} with the inputs grounded and the outputs open.

AC WAVEFORMS



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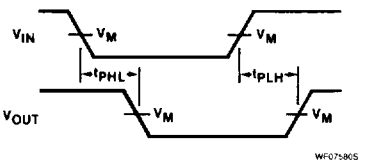
Waveform 1. Waveform For Inverting Outputs



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

Waveform 2. Waveform For Non-Inverting Outputs

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

PARAMETER		TEST CONDITIONS	74S		UNIT
			C_L = 15pF, R_L = 280Ω		
			Min	Max	
t_{PLH} t_{PHL}	Propagation delay A or B to output	Waveform 2, C = LOW, B or A = LOW		13 15	ns
t_{PLH} t_{PHL}	Propagation delay A or B to output	Waveform 1, C = LOW, B or A = HIGH		12 13.5	ns
t_{PLH} t_{PHL}	Propagation delay A or B to output	Waveform 1, C = HIGH, B or A = LOW		15 10	ns
t_{PLH} t_{PHL}	Propagation delay A or B to output	Waveform 2, C = HIGH, B or A = HIGH		12 11	ns
t_{PLH} t_{PHL}	Propagation delay C to output	Waveform 2, A = B		12 14.5	ns
t_{PLH} t_{PHL}	Propagation delay C to output	Waveform 1, A ≠ B		11.5 12	ns