

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 $V_{CC} = 5V \pm 5\%$; $T_A = 0^\circ C$ to $+70^\circ C$
Plastic DIP	N74S135N

NOTE:

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

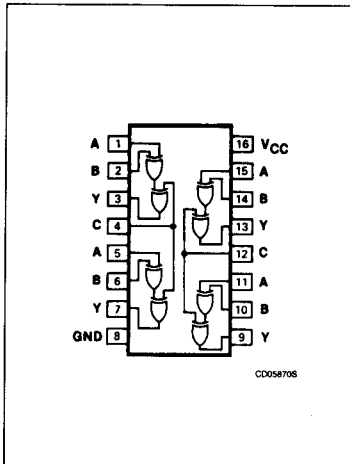
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

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

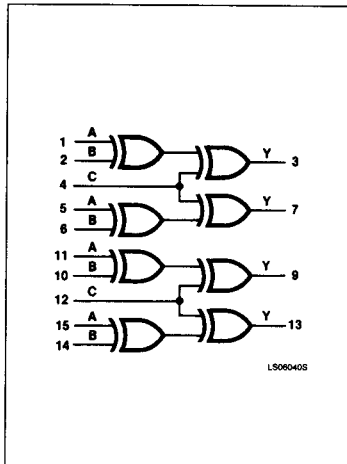
NOTE:

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

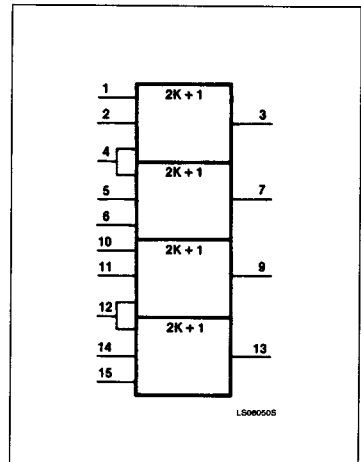
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



Gate

74S135

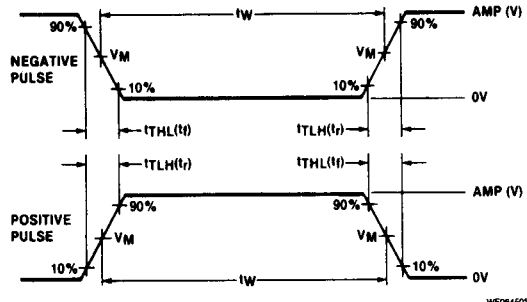
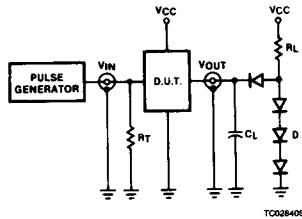
ABSOLUTE MAXIMUM RATINGS (Over operating free-air temperature range unless otherwise noted.)

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}			-1000	μA
I _{OL}			20	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

Gate

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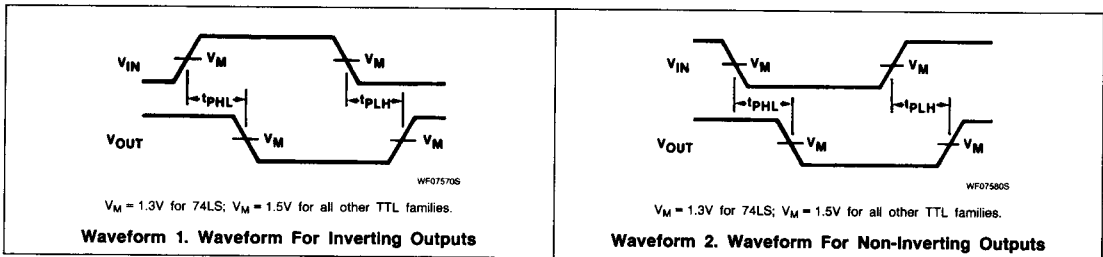
DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

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:

- 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_{CC} = 5V, T_A = 25°C.
- 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.
- Measure I_{CC} with the inputs grounded and the outputs open.

AC WAVEFORMS



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

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