

74LS01 Gate

Quad Two-Input NAND Gate (Open Collector)
Product Specification

Logic Products

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74LS01	16ns	1.6mA

ORDERING CODE

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 5\%$; $T_A = 0^\circ C$ to $+70^\circ C$
Plastic DIP	N74LS01N
Plastic SO	N74LS01D

FUNCTION TABLE

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

H = HIGH voltage level
L = LOW voltage level

NOTE:

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

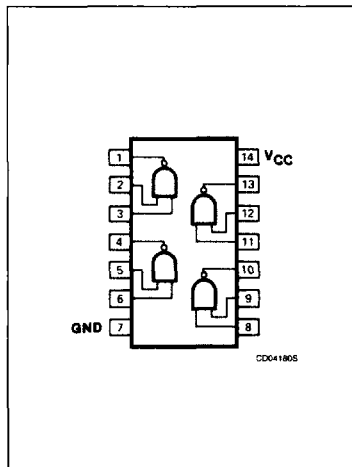
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74LS
A, B	Inputs	1LSul
Y	Output	10LSul

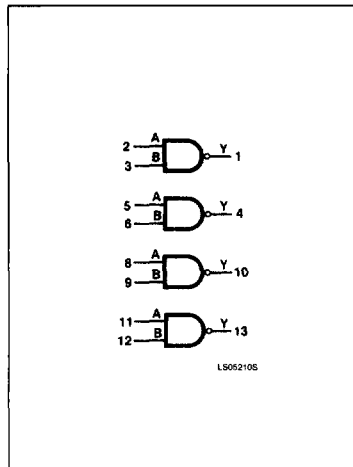
NOTE:

Where a 74LS unit load (LSul) is $20\mu A I_{IH}$ and $-0.4mA I_{IL}$.

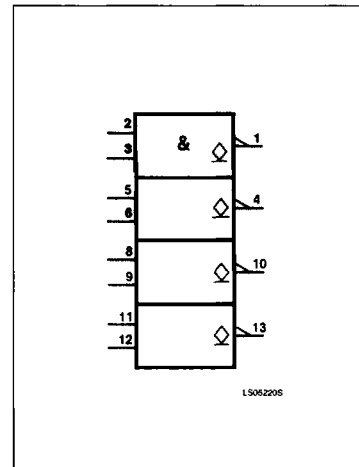
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



Gate

74LS01

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

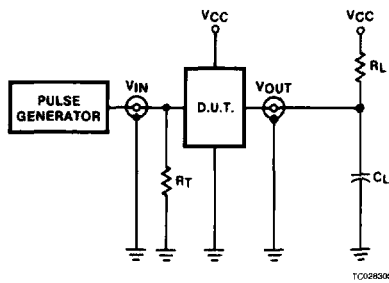
PARAMETER		74LS	UNIT
V _{CC}	Supply voltage	7.0	V
V _{IN}	Input voltage	-0.5 to +7.0	V
I _{IN}	Input current	-30 to +1	mA
V _{OUT}	Voltage applied to output in HIGH output state	-0.5 to +V _{CC}	V
T _A	Operating free-air temperature range	0 to 70	°C

RECOMMENDED OPERATING CONDITIONS

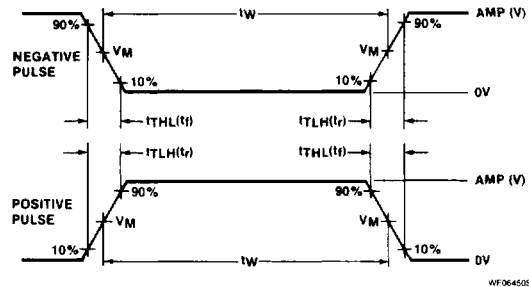
PARAMETER	74LS			UNIT
	Min	Nom	Max	
V _{CC}	4.75	5.0	5.25	V
V _{IH}	2.0			V
V _{IL}			+0.8	V
I _{IK}			-18	mA
V _{OH}			5.5	V
I _{OL}			8	mA
T _A	0		70	°C

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TEST CIRCUITS AND WAVEFORMS



Test Circuit For 74 Open Collector Outputs



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

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

Gate

74LS01

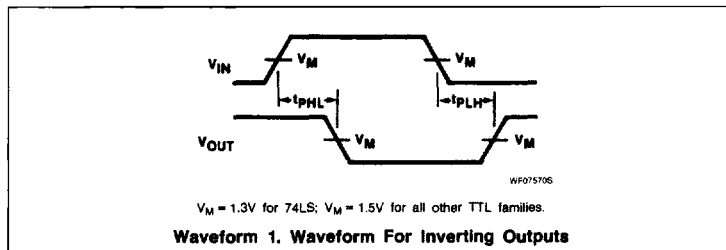
DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

PARAMETER	TEST CONDITIONS ¹	74LS01			UNIT	
		Min	Typ ²	Max		
I_{OH} HIGH-level output current	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}, V_{OH} = 5.5V$			100	μA	
V_{OL} LOW-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = \text{MIN}$	$I_{OL} = \text{MAX}$		0.35	0.5	V
		$I_{OL} = 4mA$		0.25	0.4	V
V_{IK} Input clamp voltage	$V_{CC} = \text{MIN}, I_I = I_{IK}$			-1.5	V	
I_I Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 7.0V$			0.1	mA	
I_{IH} HIGH-level input current	$V_{CC} = \text{MAX}, V_I = 2.7V$			20	μA	
I_{IL} LOW-level input current	$V_{CC} = \text{MAX}, V_I = 0.4V$			-0.4	mA	
I_{CC} Supply current (total)	$V_{CC} = \text{MAX}$	I_{CCH} Outputs HIGH		0.8	1.6	mA
		I_{CCL} Outputs LOW		2.4	4.4	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 $V_{CC} = 5V, T_A = 25^\circ C$.

AC WAVEFORM



AC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ C, V_{CC} = 5.0V$

PARAMETER	TEST CONDITIONS	74LS		UNIT
		$C_L = 15pF, R_L = 2k\Omega$		
		Min	Max	
t_{PLH} t_{PHL} Propagation delay	Waveform 1		32 28	ns