Signetics

74145
Decoder/Driver

BCD-To-Decimal Decoder/Driver (Open Collector)
Product Specification

Logic Products

FEATURES

- **80mA output drive capability**
- **15V output breakdown voltage**
- **See '45 for 30V output voltage**
- **See '42 for standard TTL outputs**

DESCRIPTION

The '145 is a 1-of-10 decoder with Open Collector outputs. This decoder accepts BCD inputs on the A_0 to A_3 address lines and generates 10 mutually exclusive active LOW outputs. When an input code greater than "9" is applied, all outputs are HIGH. This device can therefore be used as a 1-of-8 decoder with A_3 used as an active LOW enable.

The '145 features an output breakdown voltage of 15V. This device is ideal as a lamp or solenoid driver.

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74145	24ns	43mA

ORDERING CODE

PACKAGES	COMMERCIAL RANGE V_{CC} = 5V ±5%; T_A = 0°C to +70°C
Plastic DIP	N74145N
Plastic SO	N74145D

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

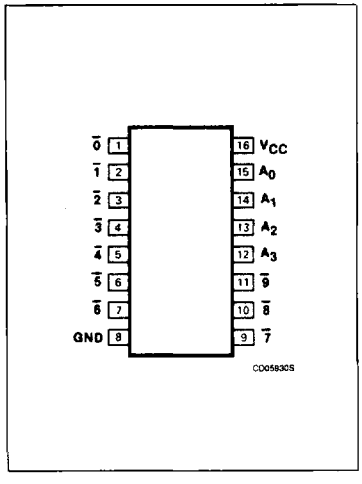
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74
All	Inputs	1ul
All	Outputs	12.5ul

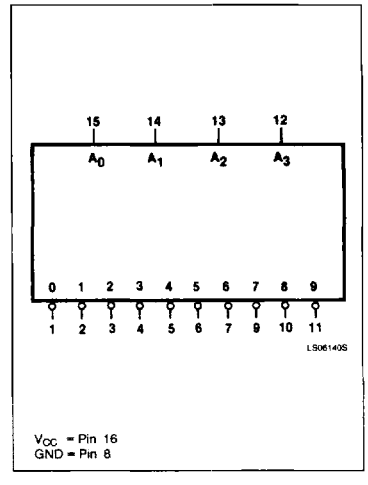
NOTE:
Where a 74 unit load (ul) is understood to be 40μA I_{IH} and −1.6mA I_{IL}.

5

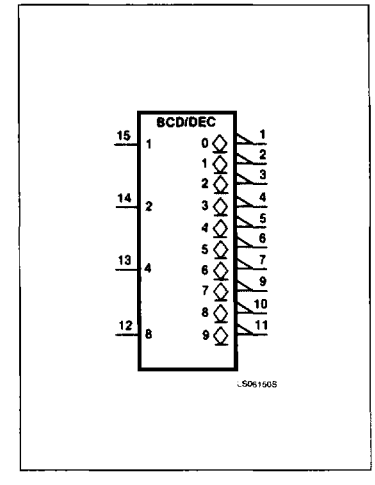
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



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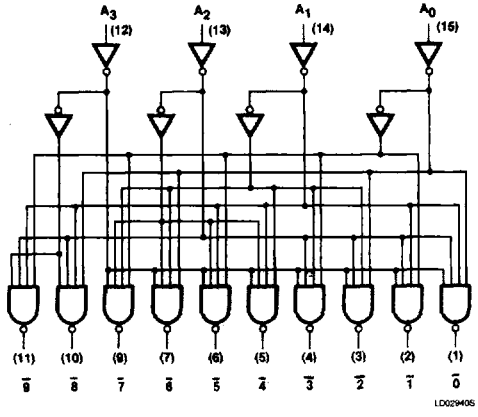
LOGIC DIAGRAM



( ) = Pin number
V_{CC} = Pin 16
GND = Pin 8

FUNCTION TABLE

A_3	A_2	A_1	A_0	$\overline{0}$	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$	$\overline{5}$	$\overline{6}$	$\overline{7}$	$\overline{8}$	$\overline{9}$
L	L	L	L	L	H	H	H	H	H	H	H	H	H
L	L	L	H	H	L	H	H	H	H	H	H	H	H
L	L	H	L	H	H	L	H	H	H	H	H	H	H
L	L	H	H	H	H	H	L	H	H	H	H	H	H
L	H	L	L	H	H	H	H	L	H	H	H	H	H
L	H	L	H	H	H	H	H	H	L	H	H	H	H
L	H	H	L	H	H	H	H	H	H	L	H	H	H
L	H	H	H	H	H	H	H	H	H	H	L	H	H
H	L	L	L	H	H	H	H	H	H	H	H	L	H
H	L	L	H	H	H	H	H	H	H	H	H	H	L
H	L	H	L	H	H	H	H	H	H	H	H	H	H
H	L	H	H	H	H	H	H	H	H	H	H	H	H
H	H	L	L	H	H	H	H	H	H	H	H	H	H
H	H	L	H	H	H	H	H	H	H	H	H	H	H
H	H	H	L	H	H	H	H	H	H	H	H	H	H
H	H	H	H	H	H	H	H	H	H	H	H	H	H

H = HIGH voltage levels
L = LOW voltage levels

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

PARAMETER		74	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 +15	V
T_A	Operating free-air temperature range	0 to 70	°C

RECOMMENDED OPERATING CONDITIONS

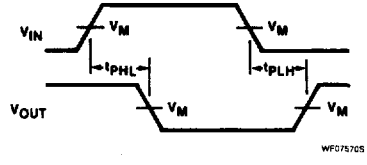
PARAMETER		74			UNIT
		Min	Nom	Max	
V_{CC}	Supply voltage	4.75	5.0	5.25	V
V_{IH}	HIGH-level input voltage	2.0			V
V_{IL}	LOW-level input voltage			+0.8	V
I_{IK}	Input clamp current			−12	mA
V_{OH}	HIGH-level output voltage			15	V
I_{OL}	LOW-level output current			80	mA
T_A	Operating free-air temperature	0		70	°C

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

PARAMETER		TEST CONDITIONS[1]		74145			UNIT
				Min	Typ[2]	Max	
I_{OH}	HIGH-level output current	V_{CC} = MIN, V_{IH} = MIN, V_{IL} = MAX, V_{OH} = MAX				250	μA
V_{OL}	LOW-level output voltage	V_{CC} = MIN, V_{IH} = MIN, V_{IL} = MAX	I_{OL} = 80mA		0.5	0.9	V
			I_{OL} = 20mA			0.4	V
V_{IK}	Input clamp voltage	V_{CC} = MIN, I_I = I_{IK}				−1.5	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 = 2.4V				40	μA
I_{IL}	LOW-level input current	V_{CC} = MAX, V_I = 0.4V				−1.6	mA
I_{CC}	Supply current[3] (total)	V_{CC} = MAX			43	70	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. Measure I_{CC} with all inputs grounded and outputs open.

AC WAVEFORM



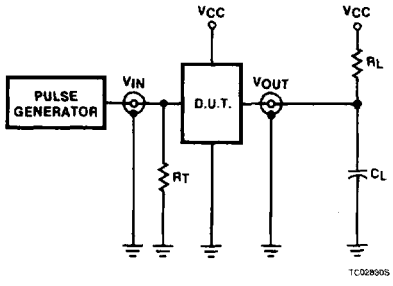
V_M = 1.3V for 74LS; V_M = 1.5V for all other TTL families.

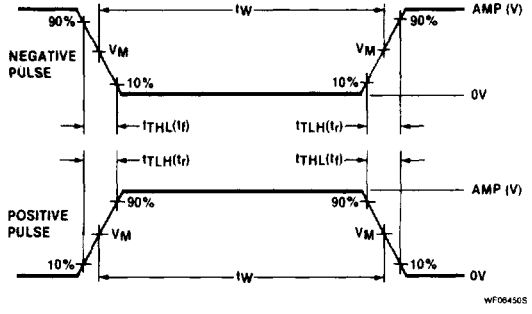
Waveform 1. Waveform For Inverting Outputs

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

PARAMETER		TEST CONDITIONS	74		UNIT
			C_L = 15pF, R_L = 100Ω		
			Min	Max	
t_{PLH} t_{PHL}	Propagation delay Address to output	Waveform 1		50 50	ns

TEST CIRCUITS AND WAVEFORMS





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

Test Circuit For 74 Open Collector Output

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.

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