GD54/74LS145

BCD-TO-DECIMAL DECODER/DRIVER

Features

- Full Decoding of Input Logic
- 80-mA Sink-Current Capability
- All Outputs Are Off for Invalid BCD Input Conditions
- Low Power Dissipation of 'LS145...35 mW Typical

Description

These monolithic BCD-to-decimal decoder/drivers consist of eight inverters and ten four-input NAND gates. The inverters are connected in pairs to make BCD input available for decoding by the NAND gates. Full decoding of valid BCD input logic ensures that all outputs remains off for all invalid binary input conditions. These decoders feature high-performance, n-p-n output transistors designed for use as indicator/relay drivers or as open-collector logic-circuit drivers.

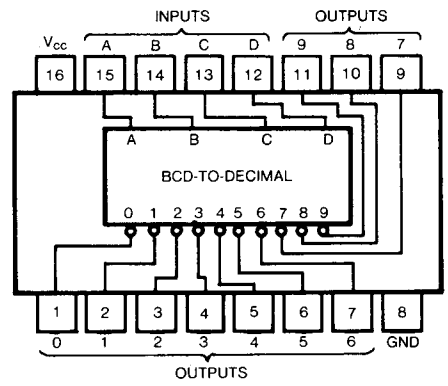
The outputs are open collector types with a breakdown voltage of 15V and an I_{OL} of 80mA (with $V_{OL} \leqq 3V$) This device is therefore suitable for use as an LSTTL/MOS interface, display tube and relay driver.

Function Table

NO.	INPUTS				OUTPUTS									
	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
10	H	L	H	L	H	H	H	H	H	H	H	H	H	H
11	H	L	H	H	H	H	H	H	H	H	H	H	H	H
12	H	H	L	L	H	H	H	H	H	H	H	H	H	H
13	H	H	L	H	H	H	H	H	H	H	H	H	H	H
14	H	H	H	L	H	H	H	H	H	H	H	H	H	H
15	H	H	H	H	H	H	H	H	H	H	H	H	H	H

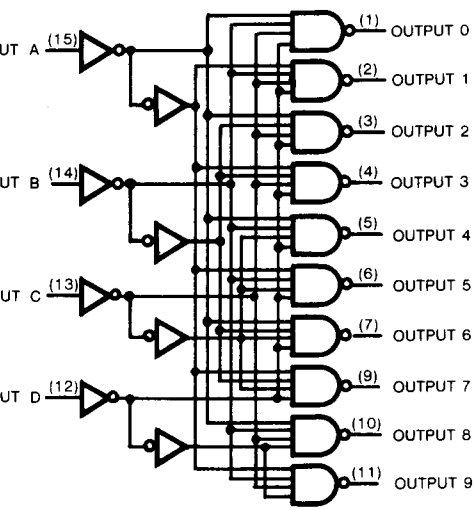
H=high level (off), L=low level (on)

Pin Configuration



Suffix-Blank: Plastic Dual In Line Package
Suffix-J : Ceramic Dual In Line Package

Functional Block Diagram



Absolute Maximum Ratings

- Supply voltage, V_{CC} 7V
- Input voltage 7V
- Operating free-air temperature range 54LS ..... −55°C to 125°C
  74LS ..... 0°C to 70°C
- Storage temperature range ..... −65°C to 150°C

Recommended Operating Conditions

SYMBOL	PARAMETER		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	54	4.5	5	5.5	V
		74	4.75	5	5.25	
V_O	Off-State output voltage	54,74			15	V
T_A	Operating free-air temperature	54	−55		125	°C
		74	0		70	

Electrical Characteristics over recommended operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITIONS			MIN	TYP (Note 1)	MAX	UNIT
V_{IH}	High-level input voltage				2			V
V_{IL}	Low-level input voltage			54			0.7	V
				74			0.8	
V_{IK}	Input clamp voltage	V_{CC}=Min, I_I=−18mA					−1.5	V
$I_{O(Off)}$	Off-state output current	V_{CC}=Min, V_{OH}=Max					250	μA
$V_{O(ON)}$	On-state output voltage	V_{CC}=Min	I_{OL}=12mA	54,74		0.25	0.4	V
		V_{IL}=Max	I_{OL}=24mA	74		0.35	0.5	
		V_{IH}=Min	I_{OL}=80mA	74		2.3	3.0	
I_I	Input current at maximum input voltage	V_{CC}=Max, V_I=7V					0.1	mA
I_{IH}	High-level input current	V_{CC}=Max, V_I=2.7V					20	μA
I_{IL}	Low-level input current	V_{CC}=Max, V_I=0.4V					−0.4	mA
I_{CC}	Supply current	V_{CC}=Max (Note 2)				7	13	mA

Note 1: All typical values are at V_{CC}=5V, T_A=25°C.
Note 2: I_{CC} is measured with all inputs grounded and outputs open.

Switching Characteristics, V_{CC} = 5V, T_A = 25°C

SYMBOL	PARAMETER	TEST CONDITION#	MIN	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L=45pF, R_L=665Ω		50	ns
t_{PHL}	Propagation delay time, high-to-low-level output			50	ns

#For load circuit and voltage waveforms, see page 3-11.