

# 1-OF-10 DECODER/DRIVER OPEN-COLLECTOR

The SN54/74LS145, 1-of-10 Decoder/Driver, is designed to accept BCD inputs and provide appropriate outputs to drive 10-digit incandescent displays. All outputs remain off for all invalid binary input conditions. It is designed for use as indicator/relay drivers or as an open-collector logic circuit driver. Each of the high breakdown output transistors will sink up to 80 mA of current. Typical power dissipation is 35 mW. This device is fully compatible with all TTL families.

- Low Power Version of 54/74145
- Input Clamp Diodes Limit High Speed Termination Effects

#### **CONNECTION DIAGRAM DIP (TOP VIEW)** $Q_9$ $P_2$ $Q_8$ $Q_7$ 16 15 13 10 6 8 3 $\mathtt{Q}_2$ $Q_5$ $\mathsf{Q}_6$ GND $Q_1$

### **PIN NAMES**

Po, P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>

Q<sub>0</sub> to Q<sub>9</sub>

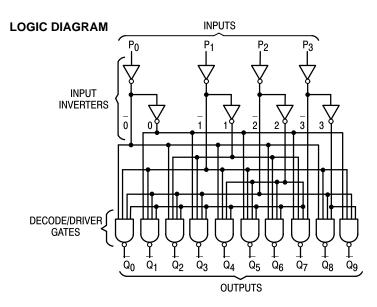
LOADING (	LOADING (Note a)						
HIGH	LOW						
0.5 U.L.	0.25 U.L.						
Open Collector	15 (7.5) U.L.						

### NOTES:

a) 1 TTL Unit Load (U.L.) =  $40 \mu A HIGH/1.6 mA LOW$ .

BCD Inputs
Outputs (Note b)

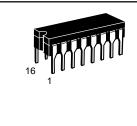
b) The Output LOW drive factor is 2.5 U.L. for Military (54) and 15 U.L. for Commercial (74) Temperature Ranges.



## SN54/74LS145

# 1-OF-10 DECODER/DRIVER OPEN-COLLECTOR

LOW POWER SCHOTTKY



J SUFFIX CERAMIC CASE 620-09



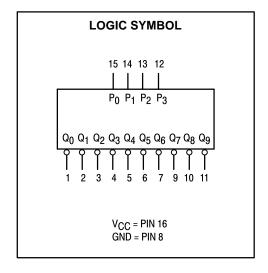
N SUFFIX PLASTIC CASE 648-08



D SUFFIX SOIC CASE 751B-03

### **ORDERING INFORMATION**

SN54LSXXXJ Ceramic SN74LSXXXN Plastic SN74LSXXXD SOIC



## SN54/74LS145

### **TRUTH TABLE**

	INP	UTS						OUT	PUTS				
P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	Q <sub>0</sub>	Q <sub>1</sub>	$\overline{Q_2}$	Q <sub>3</sub>	Q <sub>4</sub>	Q <sub>5</sub>	Q <sub>6</sub>	Q <sub>7</sub>	Q <sub>8</sub>	Q <sub>9</sub>
L	L	L	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н
L	L	L	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	н
L	L	Н	L	Н	Н	L	Н	Н	Н	Н	Н	Н	н
L	L	Н	Н	Н	Н	Н	L	Н	Н	Н	Н	Н	н
L	Н	L	L	Н	Н	Н	Н	L	Н	Н	Н	Н	Н
L	Н	L	Н	Н	Н	Н	Н	Н	L	Н	Н	Н	н
L	Н	Н	L	Н	Н	Н	Н	Н	Н	L	Н	Н	н
L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н	н
Н	L	L	L	Н	Н	Н	Н	Н	Н	Н	Н	L	Н
Н	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L
Н	L	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	н
Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	н
Н	Н	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	н
Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	н
Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	н
Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н

H = HIGH Voltage Level L = LOW Voltage Level

### **GUARANTEED OPERATING RANGES**

Symbol	Parameter		Min	Тур	Max	Unit
VCC	Supply Voltage	54 74	4.5 4.75	5.0 5.0	5.5 5.25	V
TA	Operating Ambient Temperature Range	54 74	-55 0	25 25	125 70	°C
VOH	Output Voltage — High	54, 74			15	V
lOL	Output Current — Low	54 74			12 24	mA

## SN54/74LS145

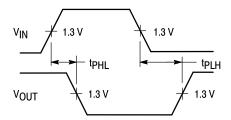
### DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

			Limits					
Symbol	Parameter		Min	Тур	Max	Unit	Tes	t Conditions
VIH	Input HIGH Voltage		2.0			V	Guaranteed Input HIGH Voltage for All Inputs	
VIL	Input LOW Voltage	54			0.7	V	Guaranteed Input	: LOW Voltage for
VIL.	Input LOW Voltage	74			0.8	V	All Inputs	
V <sub>IK</sub>	Input Clamp Diode Voltage			-0.65	-1.5	V	$V_{CC} = MIN, I_{IN} = -18 \text{ mA}$	
ЮН	Output HIGH Current	54, 74			250	μΑ	V <sub>CC</sub> = MIN, V <sub>OH</sub> = MAX	
		54, 74		0.25	0.4	V	I <sub>OL</sub> = 12 mA	V <sub>CC</sub> = V <sub>CC</sub> MIN,
VOL	Output LOW Voltage	74		0.35	0.5	V	I <sub>OL</sub> = 24 mA	$V_{IN} = V_{IL} \text{ or } V_{IH}$
		54, 74		2.3	3.0	V	I <sub>OL</sub> = 80 mA	per Truth Table
1	1				20	μΑ	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V	
l IIH	Input HIGH Current				0.1	mA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V	
IIL	Input LOW Current				-0.4	mA	$V_{CC} = MAX, V_{IN} = 0.4 V$	
Icc	Power Supply Current				13	mA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = GND	

### AC CHARACTERISTICS $(T_A = 25^{\circ}C)$

		Limits				
Symbol	Parameter	Min	Тур	Max	Unit	Test Conditions
<sup>t</sup> PHL <sup>t</sup> PLH	Propagation Delay P <sub>n</sub> Input to Q <sub>n</sub> Output			50 50	ns	V <sub>CC</sub> = 5.0 V C <sub>L</sub> = 45 pF

### **AC WAVEFORMS**



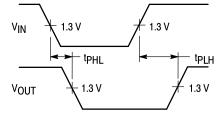
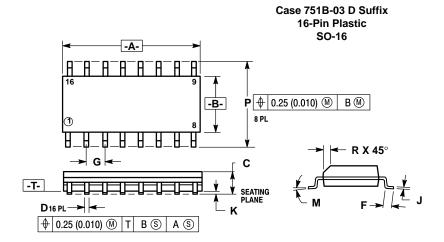
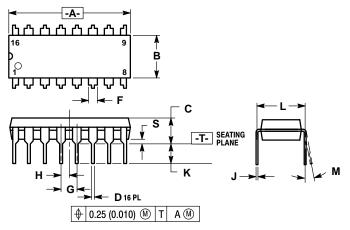
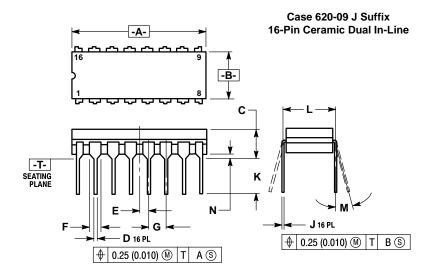


Figure 1 Figure 2



### Case 648-08 N Suffix 16-Pin Plastic





- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: MILLIMETER.
  DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
  MAXIMUM MOLD PROTRUSION 0.15 (0.006)
- PER SIDE. 751B-01 IS OBSOLETE, NEW STANDARD 751B-03.

	MILLIM	ETERS	INC	HES	
DIM	MIN	MAX	MIN	MAX	
Α	9.80	10.00	0.386	0.393	
В	3.80	4.00	0.150	0.157	
С	1.35	1.75	0.054	0.068	
D	0.35	0.49	0.014	0.019	
F	0.40	1.25	0.016	0.049	
G	1.27	BSC	0.050 BSC		
J	0.19	0.25	0.008	0.009	
K	0.10	0.25	0.004	0.009	
M	0°	7°	0°	7°	
P	5.80	6.20	0.229	0.244	
R	0.25	0.50	0.010	0.019	

#### NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
  DIMENSION "L" TO CENTER OF LEADS WHEN
  FORMED PARALLEL.
- DIMENSION "B" DOES NOT INCLUDE MOLD
- ROUNDED CORNERS OPTIONAL. 648-01 THRU -07 OBSOLETE, NEW STANDARD

	MILLIM	ETERS	INC	HES	
DIM	MIN	MAX	MIN	MAX	
Α	18.80	19.55	0.740	0.770	
В	6.35	6.85	0.250	0.270	
С	3.69	4.44	0.145	0.175	
D	0.39	0.53	0.015	0.021	
F	1.02	1.77	0.040	0.070	
G	2.54	BSC	0.100 BSC		
Н	1.27	BSC	0.050	BSC	
J	0.21	0.38	0.008	0.015	
K	2.80	3.30	0.110	0.130	
L	7.50	7.74	0.295	0.305	
M	0°	10°	0°	10°	
S	0.51	1.01	0.020	0.040	

- OTES:
  1. DIMENSIONING AND TOLERANCING PER ANSI
  Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION LTO CENTER OF LEAD WHEN

- 5. DIMENSION I TO CENTER OF LEAD WHEN FORMED PARALLEL.
   4. DIM F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.
   5. 620-01 THRU -08 OBSOLETE, NEW STANDARD
- 620-09.

	MILLIM	ETERS	INC	HES			
DIM	MIN	MAX	MIN	MAX			
Α	19.05	19.55	0.750	0.770			
В	6.10	7.36	0.240	0.290			
С	_	4.19	_	0.165			
D	0.39	0.53	0.015	0.021			
E	1.27	BSC	0.050 BSC				
F	1.40	1.77	0.055	0.070			
G	2.54	BSC	0.100	BSC			
J	0.23	0.27	0.009	0.011			
K	_	5.08	_	0.200			
L	7.62	BSC	0.300	BSC			
M	0°	15°	0°	15°			
N	0.39	0.88	0.015	0.035			

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