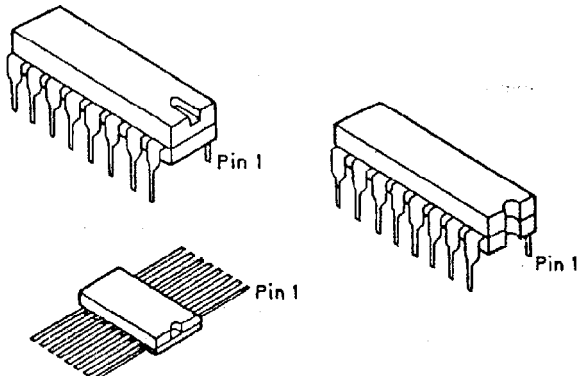


BRITISH STANDARDS INSTITUTION 2 PARK STREET, LONDON. W1A 2BS	BS CECC 90103 - 133 ISSUE 1 JANUARY 1982  Page 1 of 21 pages
Specification available from:- AS SHOWN IN PD 9002 AND CECC 00 200 AND ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH: BS CECC 90 000 : 1976 BS CECC 90 100 : 1977	MANUFACTURERS TYPE NUMBER 54LS447 64LS447 74LS447 84LS447 SEE PD 9002 AND CECC 00 200 For ordering information see clause 1
Outline not to scale: Isometric projection Marking information see clause 1  Refer to IEC 191-1-50a (type A50C) Dual-in-Line (plastic or ceramic) refer to Appendix A1.3 Flatpack (metal or ceramic)	BCD-TO-SEVEN SEGMENT DECODERS/DRIVERS WITH OPEN COLLECTOR OUTPUTS TYPICAL CONSTRUCTION SILICON MONOLITHIC BIPOLAR TTL-LOW-POWER SCHOTTKY ASSESSMENT LEVELS R, S, T AND V

1. Type description

1.1 Truth table (see page 2)

Refer to Qualified Products List PD 9002 and/or CECC 00 200
 for details of manufacturers approved to this specification

1.1 Truth table (contd)

DECIMAL OR FUNCTION	INPUTS						BI/RBO†	OUTPUTS							NOTE
	LT	RBI	D	C	B	A		a	b	c	d	e	f	g	
0	H	H	L	L	L	L	H	ON	ON	ON	ON	ON	ON	OFF	1
1	H	X	L	L	L	H	H	OFF	ON	ON	OFF	OFF	OFF	OFF	
2	H	X	L	L	H	L	H	ON	ON	OFF	ON	ON	OFF	ON	
3	H	X	L	L	H	H	H	ON	ON	ON	ON	OFF	OFF	ON	
4	H	X	L	H	L	L	H	OFF	ON	ON	OFF	OFF	ON	ON	
5	H	X	L	H	L	H	H	ON	OFF	ON	ON	OFF	ON	ON	
6	H	X	L	H	H	L	H	ON	OFF	ON	ON	ON	ON	ON	
7	H	X	L	H	H	H	H	ON	ON	ON	OFF	OFF	OFF	OFF	
8	H	X	H	L	L	L	H	ON	ON	ON	ON	ON	ON	ON	
9	H	X	H	L	L	H	H	ON	ON	ON	ON	OFF	ON	ON	
10	H	X	H	L	H	L	H	OFF	OFF	OFF	ON	ON	OFF	ON	
11	H	X	H	L	H	H	H	OFF	OFF	ON	ON	OFF	OFF	ON	
12	H	X	H	H	L	L	H	OFF	ON	OFF	OFF	OFF	ON	ON	
13	H	X	H	H	L	H	H	ON	OFF	OFF	ON	OFF	ON	ON	
14	H	X	H	H	H	L	H	OFF	OFF	OFF	ON	ON	ON	ON	
15	H	X	H	H	H	H	H	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
BI	X	X	X	X	X	X	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2
RBI	H	L	L	L	L	L	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3
LT	L	X	X	X	X	X	H	ON	ON	ON	ON	ON	ON	ON	4

H = High level

L = Low level

X = Logic level irrelevant

1.1.1

NOTE a. The blanking input (BI) must be open or held at a High logic level when output functions 0 through 15 are desired. The ripple-blanking input (RBI) must be open or High if blanking of a decimal zero is not desired.

NOTE b. When a Low logic level is applied directly to the blanking input (BI), all segment outputs are off regardless of the level of any other input.

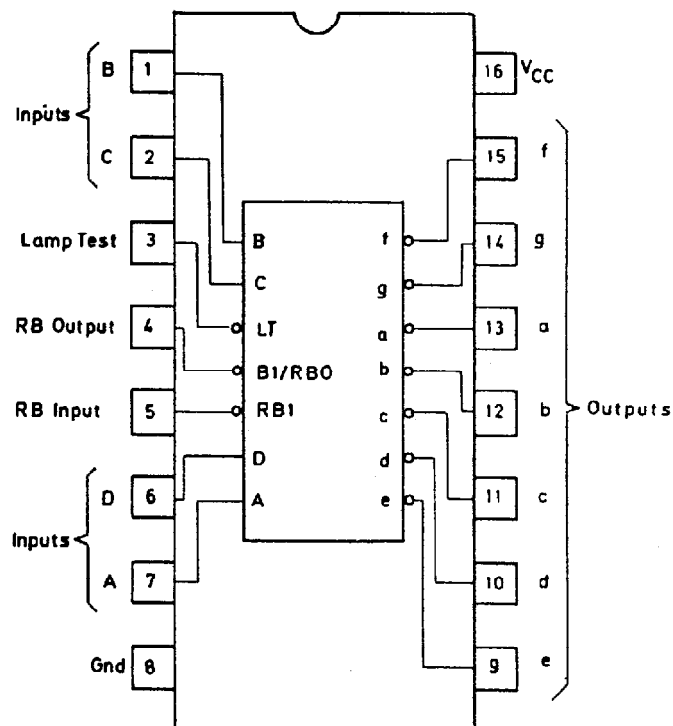
NOTE c. When ripple-blanking input (RBI) and inputs A, B, C and D are at a Low level with the lamp-test input High, all segment outputs go off and the ripple-blanking output (RBO) goes to a Low level (response condition).

NOTE d. When the blanking input/ripple blanking output (BI/RBO) is open or held High and a Low is applied to the lamp-test input, all segment outputs are on.

† BI/RBO is wire AND logic serving as blanking input (BI) and/or ripple-blanking output (RBO).

1.2 Terminal identification, type designation and marking

1.2.1 Terminal identification



BCD-to-seven segment decoders/drivers
with open-collector outputs

1.2.2 Type designation

TEMPERATURE RANGE	PACKAGE		
	Ceramic Dual-in-Line	Plastic Dual-in-Line	Ceramic Flatpack
0 + 70	74LS447J	N	W
-25 + 85	84LS447J		
-40 + 85	64LS447J		
-55 +125	54LS447J		

1.2.3 Marking

Each integrated circuit shall bear the following markings:

- (1) Terminal identification
- (2) Type designation
- (3) Date code
- (4) Factory identification code (unless derived from trademark)
- (5) Manufacturers trade name or mark
- (6) Mark of conformity (unless a certificate of conformity is used)

1.3 Ordering information

Orders for these integrated circuits shall contain the following minimum information:

Manufacturers integrated circuit type designation, screening procedures and assessment levels as detailed to this CECC specification number.

(For details of screening procedures see Appendix A1.1)

2. Limiting conditions of use (not for inspection purposes)

2.1	Maximum continuous supply voltage	V_{CC}	-0,5V +7,0V				
2.2	Maximum input voltage	V_I	-0,5V +7,0V				
				54LS	64LS	74LS	84LS
2.3	Minimum and maximum operating ambient temperatures	$T_{amb}(^{\circ}C)$	min. -55 max. +125	-40 +85	0 +70	-25 +85	
2.4	Minimum and maximum storage temperatures	$T_{stg}(^{\circ}C)$	min. -65 max. +150	(All types)			

3. Recommended operating conditions and associated characteristics (not for inspection purposes)

3.1 Recommended operating conditions.

These apply over the operating ambient temperature range unless otherwise stated.

3.1 (contd)

Description	Symbol	Type	Value	Unit
Positive supply voltage range	V_{CC}	54LS 64/74/84LS	4,5 - 5,5 4,75 - 5,25	V V
Minimum value of High level input voltage	V_{IHB}	All types	2,0	V
Maximum value of High level input voltage	V_{IHA}	All types	5,5	V
Minimum value of Low level input voltage	V_{ILB}	All types	-0,3	V
Maximum value of Low level input voltage	V_{ILA}	54LS 64/74/84LS	0,7 0,8	V V
Maximum value of Low level output current for each output BI/RBO BI/RBO	I_{OLA}	54LS 64/74/84LS	1,6 3,2	mA mA
Maximum value of output current for each output at V_{OH} BI/RBO	I_{OHA}	All types	50,0	μ A
Maximum value of "on"-level output current a through g a through g	$I_{OUT(on)}$	54LS 64/74/84LS	12,0 24,0	mA mA
Maximum value of "off"-level output current (leakage) $V_{OUT} = V_{OUTA(on)}$ a through g	$I_{OUT(off)}$	All types	250,0	μ A
D.C noise margin at Low level ($V_{ILA} - V_{OLA}$) at High level ($V_{OHB} - V_{IHB}$)	V_{NL} V_{NH}	All types 54LS 64/74/84LS	0,3 0,5 0,7	V V V

3.2 Associated characteristics

- 3.2.1 Minimum and maximum values are given for the worst case operation over the ambient temperature range, except for those conditions marked with an asterisk (*)

3.2.1 (contd)

	54LS	64LS	74LS	84LS	
T _{amb} min.	-55	-40	0	-25	°C
T _{amb} max.	+125	+85	+70	+85	
V _{CC} min.	4,5	4,75			V
V _{CC} max.	5,5	5,25			

3.2.2

Characteristics	Conditions	$V_{CC}(V)$	Symbol	Min.	Max.	Unit
Total supply current of the device	All outputs open and all inputs at 4,5V	V_{CC} max.	I_{CC}	-	13,0	mA
High level input current	$V_{IH(1)} = 7,0V$	V_{CC} max.	$I_{IH(1)}$	-	0,1	mA
	$V_{IH(2)} = 2,4V$	V_{CC} max.	$I_{IH(2)}$	-	20,0	µA
Low level input current	$V_{IL} = 0,4V$ (4) BI/RBO	V_{CC} max.	$-I_{IL}$	-	1,2	mA
	Any other input		$-I_{IL}$	-	0,4	mA
Input clamping voltage	$-I_{IC} = 18,0mA$	V_{CC} min.	$-V_{ICA}$	-	1,5	V
Output voltage	All types $I_{OH} = -50,0\mu A$ BI/RBO only	V_{CC} min.	V_{OH}	2,4	-	V
	All types $I_{OL} = 1,6mA$ (1) BI/RBO		V_{OL}	-	0,4	V
	64/74/84LS $I_{OL} = 3,2mA$ (2) BI/RBO		V_{OL}	-	0,5	V
Output short circuit current	$V_{IN} = V_{ILA}$ *or V_{IHB} * as appropriate† $V_O = 0V$ (3) BI/RBO only	V_{CC} max.	$-I_{OS}$	0,3	2,0	mA

- (1) Fan out = 10, (2) Fan out = 20,
 (3) Only one output at a time, duration $t < 1$ sec
 (4) Applied to each input in turn

*See 3.2.1 of this specification

**Refer to truth table

3.2.2 (contd)

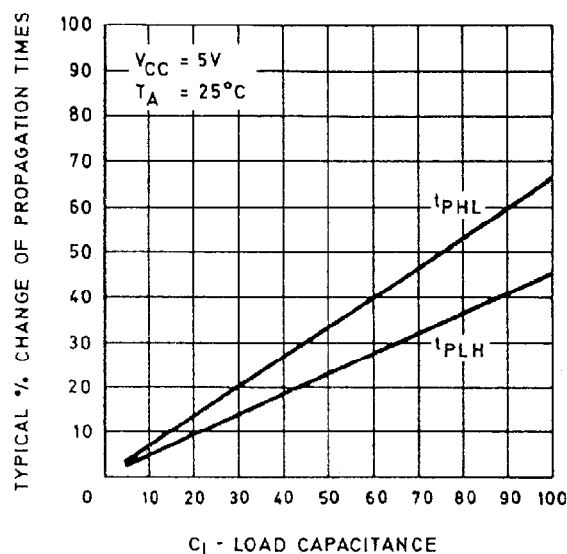
Characteristics	Conditions	$V_{CC}(V)$	Symbol	Min.	Max.	Unit
"on"-level output voltage	$V_{IN} = V_{ILA}^*$ or V_{IHB}^* as appropriate†					
All types	$I_{OUT(on)} = 12,0mA$ a through g	$V_{CC} \text{ min.}$	$V_{OUT(on)}$	-	0,4	V
64/74/84LS	$I_{OUT(on)} = 24,0mA$ a through g	$V_{CC} \text{ min.}$	$V_{OUT(on)}$	-	0,5	V
"off"-level output voltage	a through g	$V_{CC} \text{ max.}$	$V_{OUT(off)}$	-	7,0	V
Propagation times	$T_{amb} = 25^{\circ}C^*$ test conditions as in Sub-group A5	5,0V				
All types						
High to Low level	Any input to Any output		t_{PHL}	-	100,0	ns
	RBI input to output		t_{PHL}	-	100,0	ns
Low to High level	Any input to Any output		t_{PLH}	-	100,0	ns
	RBI input to output		t_{PLH}	-	100,0	ns

*See 3.2.1 of this specification

†Refer to truth table

3.3 Supplementary information

3.3.1 Change of typical propagation time with output loading



Propagation time Vs. load capacitance

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