

BRITISH STANDARDS INSTITUTION

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BS CECC 90103 - 095

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Page 1 of 21 pages

ELECTRONIC COMPONENTS OF ASSESSED QUALITY
 DETAIL SPECIFICATION IN ACCORDANCE WITH:

BS CECC 90 000 : 1976
 BS CECC 90 100 : 1977

MANUFACTURERS TYPE NUMBER

54LS249
 64LS249
 74LS249
 84LS249

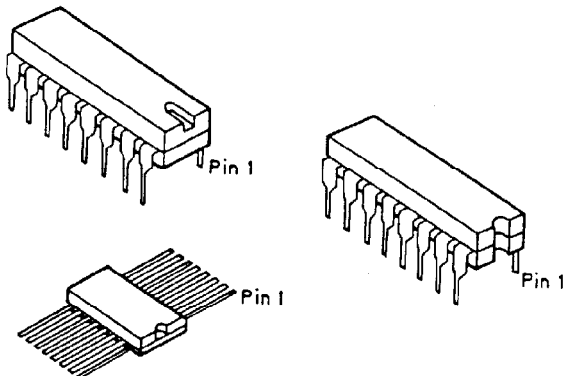
SEE PD 9002 AND CECC 00 200
 For ordering information see
 clause 1

BCD-TO-SEVEN-SEGMENT DECODERS/
 DRIVERS (OPEN COLLECTOR
 OUTPUTS)

TYPICAL CONSTRUCTION
 SILICON MONOLITHIC
 BIPOLAR TTL-LOW-POWER
 SCHOTTKY

ASSESSMENT LEVELS
 R, S, T AND V

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)

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	H	H	H	H	H	H	L	1
1	H	X	L	L	L	H	H	L	H	H	L	L	L	L	
2	H	X	L	L	H	L	H	H	H	L	H	H	L	H	
3	H	X	L	L	H	H	H	H	H	H	H	L	L	H	
4	H	X	L	H	L	L	H	L	H	H	L	L	H	H	
5	H	X	L	H	L	H	H	H	L	H	H	H	H	H	
6	H	X	L	H	H	L	H	H	L	H	H	H	H	H	
7	H	X	L	H	H	H	H	H	H	H	L	L	L	L	
8	H	X	H	L	L	L	H	H	H	H	H	H	H	H	
9	H	X	H	L	L	H	H	H	H	H	H	L	H	H	
10	H	X	H	L	H	L	H	L	L	L	H	H	L	H	
11	H	X	H	L	H	H	H	L	L	H	H	L	L	H	
12	H	X	H	H	L	L	H	L	H	L	L	L	H	H	
13	H	X	H	H	L	H	H	H	L	L	H	L	H	H	
14	H	X	H	H	H	L	H	L	L	L	H	H	H	H	
15	H	X	H	H	H	H	H	L	L	L	L	L	L	L	
BI	X	X	X	X	X	X	L	L	L	L	L	L	L	L	2
RBI	H	L	L	L	L	L	L	L	L	L	L	L	L	L	3
LT	L	X	X	X	X	X	H	H	H	H	H	H	H	H	4

H = High level

L = Low level

X = Logic level irrelevant

NOTE 1 The blanking input (BI) must be open or held at a high logic level when output functions 0 through 15 are desired.

NOTE 2 When a low logic level is applied directly to the blanking input (BI), all segment outputs are Low regardless of the level of any other input.

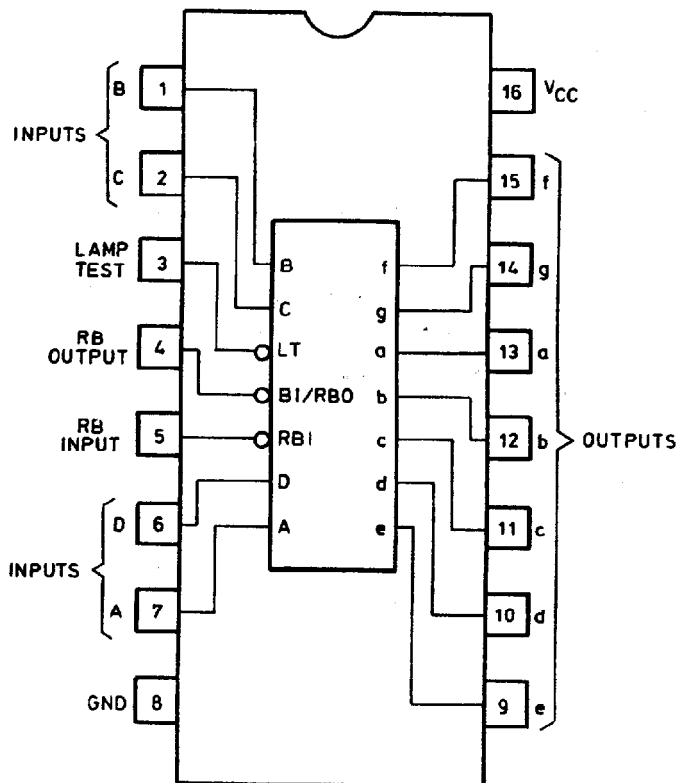
NOTE 3 When ripple-blanking input (RBI) and inputs A, B, C and D are at a Low level with the lamp-test input High, all segment outputs go Low and the ripple-blanking output (RBO) goes to a Low level (response condition).

NOTE 4 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 High.

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 (open collector outputs)

1.2.2 Type designation

TEMPERATURE RANGE	PACKAGE		
	Ceramic Dual-in-Line	Plastic Dual-in-Line	Ceramic Flatpack
0 + 70	74LS249J	N	W
-25 + 85	84LS249J		
-40 + 85	64LS249J		
-55 +125	54LS249J		

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 voltages

2.2.1 Minimum 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.

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

3.1 (contd)

Description	Symbol	Type	Value	Unit
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	I_{OLA}	54LS	4,0	mA
a through g	I_{OLA}	64/74/84LS	8,0	mA
BI/RBO	I_{OLA}	54LS	1,6	mA
BI/RBO	I_{OLA}	64/74/84LS	3,2	mA
Maximum value of output current for each output at V_{OH}	I_{OHA}	All types	250,0	μA
a through g (Leakage)	I_{OHA}	All types	-50,0	μA
BI/RBO				
D.C. noise margin				
at Low level ($V_{ILA} - V_{OLA}$)	V_{NL}	All types	0,3	V
at High level ($V_{OHB} - V_{IHB}$)	V_{NH}	54LS	0,5	V
		64/74/84LS	0,7	V
Maximum value of applied output voltage a through g	V_{OH}	All types	5,5	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 (*)

	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			

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3.2.2

Characteristics	Conditions	$V_{CC}(V)$	Symbol	Min.	Max.	Unit
Total supply current per package	Inputs at 4,5V Outputs open	V_{CC} max.	I_{CC}	-	15,0	mA
High level input current	$V_{IH(1)} = 7,0V$ Any input except BI/RBO	V_{CC} max.	$I_{IH(1)}$	-	0,1	mA
	$V_{IH(2)} = 2,4V$ Any input except BI/RBO	V_{CC} max.	$I_{IH(2)}$	-	20,0	μA
Low level input current	$V_{IL} = 0,4V$ to each input in turn, other related inputs at 4,5V BI/RBO	V_{CC} max.	$-I_{IL}$	-	1,2	mA
	Any other	V_{CC} max.	$-I_{IL}$	-	0,4	
Input clamping voltage	$-I_{IC} = 18,0mA$	V_{CC} min.	$-V_{ICA}$	-	1,5	V
Output voltage	All types BI/RBO	V_{CC} min.	V_{OH}	2,4	-	V
	All types $I_{OL} = 1,6mA$ (1)	V_{CC} min.	V_{OL}	-	0,4	V
	64/74/84LS BI/RBO $I_{OL} = 3,2mA$ (2)	V_{CC} min.	V_{OL}	-	0,5	V
	All types BI/RBO $I_{OL} = 4,0mA$ (1)	V_{CC} min.	V_{OL}	-	0,4	V
	64/74/84LS a through g $I_{OL} = 8,0mA$ (2)	V_{CC} min.	V_{OL}	-	0,5	V
	a through g					
Output short circuit current	$V_{IN} = V_{ILA}^*$ or V_{IHB}^* as appropriate† $V_O = 0V$ or 4,5V (3) BI/RBO	V_{CC} max.	$-I_{OS}$	0,3	2,0	mA
Propagation times	$T_{amb} = 25^\circ C^*$ test conditions as in Sub-group A5	5,0V				
High to Low level	A input to Output		t_{PHL}	-	100,0	ns
	RBI input to Output		t_{PHL}	-	100,0	ns
Low to High level	A input to Output		t_{PLH}	-	100,0	ns
	RBI input to Output		t_{PLH}	-	100,0	ns

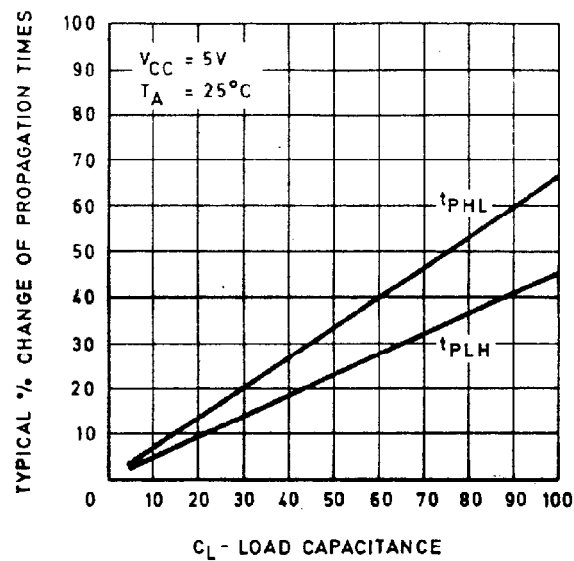
(1) Fan out = 10, (2) Fan out = 20, (3) Only one output at a time, duration $t \leq 1$ sec

* 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

3.3.2 Variation of propagation time with temperature

