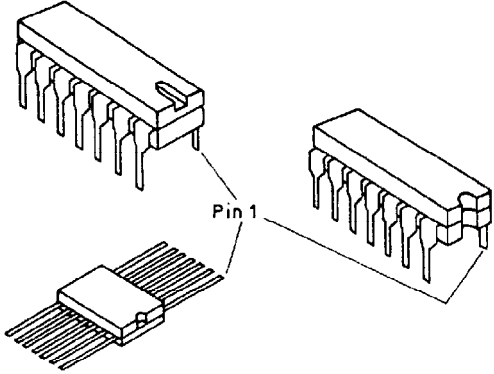


|                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BRITISH STANDARDS INSTITUTION</b><br>2 PARK STREET, LONDON. W1A 2BS<br><br>Specification available from:- AS SHOWN IN PD 9002<br>AND CECC 00 200 AND                                                                                                                                                                        | BS CECC 90103 - 079<br><br>ISSUE 1<br><br>NOVEMBER 1981<br><br><br><br>Page 1 of 18 pages                                                                                         |
| <b>ELECTRONIC COMPONENTS OF ASSESSED QUALITY</b><br><b>DETAIL SPECIFICATION IN ACCORDANCE WITH:</b><br><br>BS CECC 90 000 : 1976<br>BS CECC 90 100 : 1977                                                                                                                                                                      | <b>MANUFACTURERS TYPE NUMBER</b><br>54LS183<br>64LS183<br>74LS183<br>84LS183                                                                                                                                                                                         |
| <b>Outline not to scale: Isometric projection</b><br><b>Marking information see clause 1</b><br><br><br><br>Refer to IEC 191-1-50a (type A50B)<br>Dual-in-Line (plastic or ceramic)<br>refer to Appendix A1.3<br>Flatpack (metal or ceramic) | SEE PD 9002 AND CECC 00 200<br>For ordering information see<br>clause 1<br><br><b>DUAL CARRY-SAVE FULL ADDERS</b><br><br><br><b>TYPICAL CONSTRUCTION</b><br>SILICON MONOLITHIC<br>BIPOLAR TTL-LOW-POWER<br>SCHOTTKY<br><br><b>ASSESSMENT LEVELS</b><br>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

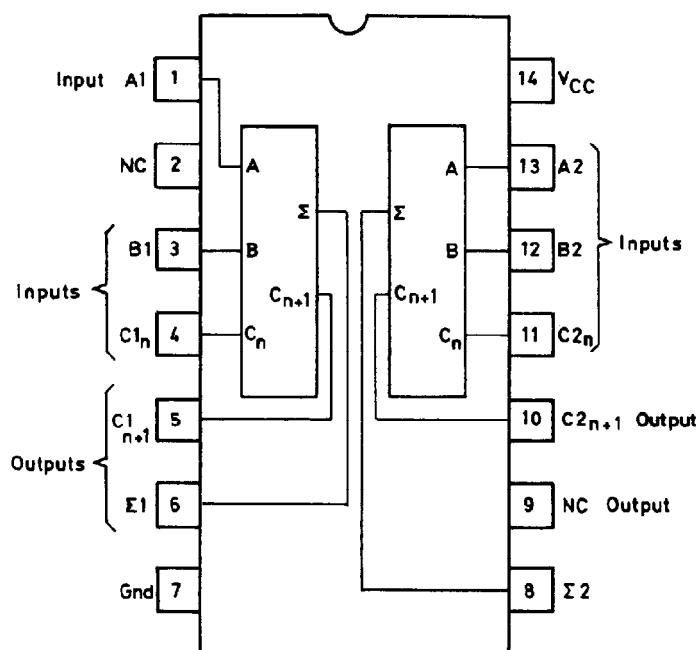
1.1 Truth table (contd)  
(Each adder)

| INPUTS |   |   | OUTPUTS  |           |
|--------|---|---|----------|-----------|
| $C_n$  | B | A | $\Sigma$ | $C_{n+1}$ |
| L      | L | L | L        | L         |
| L      | L | H | H        | L         |
| L      | H | L | H        | L         |
| L      | H | H | L        | H         |
| H      | L | L | H        | L         |
| H      | L | H | L        | H         |
| H      | H | L | L        | H         |
| H      | H | H | H        | H         |

H = High level  
L = Low level

1.2 Terminal identification, type designation and marking

1.2.1 Terminal identification



NC = No connection

Dual carry-save full adders

Terminals marked with N.C. are not connected internally and may be used as electrical support points. The applied voltage shall not exceed 7,0V.

## 1.2.2 "Type" designation

| TEMPERATURE<br>RANGE | PACKAGE                 |                         |                     |
|----------------------|-------------------------|-------------------------|---------------------|
|                      | Ceramic<br>Dual-in-Line | Plastic<br>Dual-in-Line | Ceramic<br>Flatpack |
| 0 + 70               | 74LS183J                | N                       | W                   |
| -25 + 85             | 84LS183J                |                         |                     |
| -40 + 85             | 64LS183J                |                         |                     |
| -55 +125             | 54LS183J                |                         |                     |

## 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<br>+7,0V |
| 2.2   | Maximum input voltages                                           |          |                |
| 2.2.1 | Maximum input voltage                                            | $V_I$    | -0,5V<br>+7,0V |
| 2.2.2 | Maximum input voltage between multiple emitter transistor inputs | $V_{II}$ | +5,5V          |

2. Limiting conditions of use (contd)

|     |                                                    |                      | 54LS                  | 64LS        | 74LS     | 84LS       |
|-----|----------------------------------------------------|----------------------|-----------------------|-------------|----------|------------|
| 2.3 | Minimum and maximum operating ambient temperatures | $T_{amb}(^{\circ}C)$ | min. -55<br>max. +125 | -40<br>+85  | 0<br>+70 | -25<br>+85 |
| 2.4 | Minimum and maximum storage temperatures           | $T_{stg}(^{\circ}C)$ | min. -65<br>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<br>64/74/84LS | 4,5 - 5,5<br>4,75 - 5,25 | V<br>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<br>64/74/84LS | 0,7<br>0,8               | V<br>V   |
| Maximum value of Low level output current for each output   | $I_{OLA}$ | 54LS<br>64/74/84LS | 4,0<br>8,0               | mA<br>mA |
| Maximum value of output current for each output at $V_{OH}$ | $I_{OHA}$ | All types          | -400,0                   | $\mu A$  |
| 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<br>64/74/84LS | 0,5<br>0,7               | V<br>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 <sub>amb</sub> min. | -55  | -40  | 0    | -25  | °C |
| T <sub>amb</sub> max. | +125 | +85  | +70  | +85  |    |
| V <sub>CC</sub> min.  | 4,5  | 4,75 |      |      | V  |
| V <sub>CC</sub> max.  | 5,5  | 5,25 |      |      |    |

## 3.2.2

| Characteristics                  | Conditions                                                             | $V_{CC}(V)$   | Symbol      | Min. | Max. | Unit    |
|----------------------------------|------------------------------------------------------------------------|---------------|-------------|------|------|---------|
| Total supply current per package | Inputs grounded and outputs open.                                      | $V_{CC}$ max. | $I_{CCL}$   | -    | 17,0 | mA      |
|                                  | Inputs at 4,5V outputs open                                            |               | $I_{CCH}$   | -    | 14,0 | mA      |
| High level input current         | $V_{IH(1)} = 7,0V$ to each input in turn, other related inputs at 0V.  | $V_{CC}$ max. | $I_{IH(1)}$ | -    | 0,3  | mA      |
|                                  | $V_{IH(2)} = 2,7V$ to each input in turn other related inputs at 0V.   | $V_{CC}$ max. | $I_{IH(2)}$ | -    | 60,0 | $\mu A$ |
| Low level input current          | $V_{IL} = 0,4V$ to each input in turn, other related inputs at 7,0V.   | $V_{CC}$ max. | $-I_{IL}$   | -    | 1,2  | mA      |
| Input clamping voltage           | $-I_{IC} = 18,0mA$                                                     | $V_{CC}$ min. | $-V_{ICA}$  | -    | 1,5  | V       |
| Output voltage                   | $V_{IN} = V_{ILA}$ or 2,0V as appropriate<br>Test each output in turn. | $V_{CC}$ min. |             |      |      |         |
|                                  | 54LS<br>$I_{OH} = -400,0\mu A$                                         |               | $V_{OH}$    | 2,5  | -    | V       |
|                                  | 64/74/84LS<br>$I_{OH} = -400,0\mu A$                                   |               | $V_{OH}$    | 2,7  | -    | V       |
|                                  | All types<br>$I_{OL(1)} = 4,0mA$ (1)                                   |               | $V_{OL(1)}$ | -    | 0,4  | V       |
|                                  | 64/74/84LS<br>$I_{OL(2)} = 8,0mA$ (2)                                  |               | $V_{OL(2)}$ | -    | 0,5  | V       |

(1) Fan out = 10, (2) Fan out = 20

## 3.2.2 (contd)

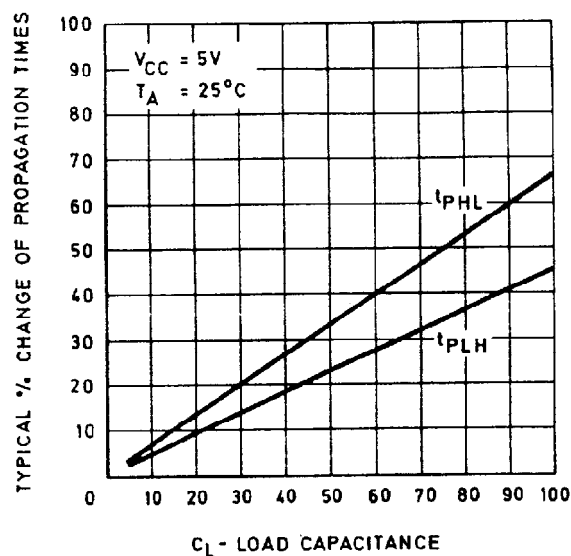
| Characteristics                | Conditions                                                        | $V_{CC}(V)$   | Symbol                 | Min.   | Max.         | Unit     |
|--------------------------------|-------------------------------------------------------------------|---------------|------------------------|--------|--------------|----------|
| Output short circuit current   | $V_{IN} = V_{ILA}$ or 2,0V<br>as appropriate<br>$V_O = 0V$ (3)    | $V_{CC}$ max. | $-I_{OS}$              | 15,0   | 130,0        | mA       |
| Propagation times<br>All types | $T_{amb} = 25^\circ C^*$<br>test conditions as<br>in Sub-group A5 | 5,0V          | $t_{PHL}$<br>$t_{PLH}$ | -<br>- | 33,0<br>15,0 | ns<br>ns |

(3) Only one output at a time, duration  $t \leq 1$  sec

\*See clause 3.2.1 of this specification

## 3.3 Supplementary information

## 3.3.1 Change of typical time with output loading



Propagation time Vs. load capacitance