

## CMOS 12-BIT PARITY TREE

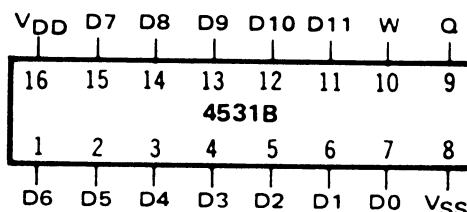
### FEATURES

- ◆ Variable Word Length
- ◆ Buffered Output
- ◆ Parity Selection Input

### DESCRIPTION

The 4531B 12-Bit Parity Tree is constructed with MOS P-channel and N-channel enhancement-mode devices in a single monolithic structure. The circuit consists of 12 Data-bit inputs (D0 thru D11), an even or odd Parity Selection input (W), and an output (Q). The Parity Selection input can be considered as an additional bit. Words of less than 13 bits can generate an even or odd parity output if the remaining inputs are selected to contain an even number of 1's. Words of greater than 12 bits can be accommodated by cascading other 4531B devices by using the W input. Applications include checking or including a redundant (parity) bit to a word for error detection/correction systems, controller for remote digital sensors or switches (digital event detection/correction), or as a multiple-input summer without carries.

### CONNECTION DIAGRAM (all packages)



### RECOMMENDED OPERATING CONDITIONS

For maximum reliability:

|                       |                   |             |     |
|-----------------------|-------------------|-------------|-----|
| DC Supply Voltage     | $V_{DD} - V_{SS}$ | 3 to 15     | Vdc |
| Operating Temperature | $T_A$             | -55 to +125 | °C  |
|                       |                   | -40 to +85  | °C  |

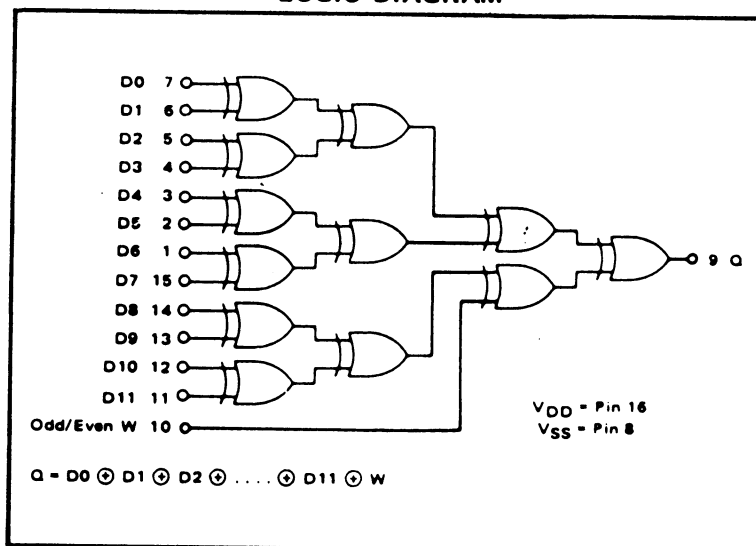
### TRUTH TABLE

| INPUTS |     |     |     |     |     |     | OUTPUT       |
|--------|-----|-----|-----|-----|-----|-----|--------------|
| W      | D11 | D10 | D9  | D8  | D7  | D6  | Q*           |
| 0      | 0   | 0   | 0   | 0   | 0   | 0   | 0 (0)        |
| 0      | 0   | 0   | 0   | 0   | 0   | 1   | 1 (1)        |
| 0      | 0   | 0   | 0   | 0   | 1   | 0   | 2 (2)        |
| 0      | 0   | 0   | 0   | 0   | 1   | 1   | 3 (3)        |
| 0      | 0   | 0   | 0   | 1   | 0   | 0   | 4 (4)        |
| 0      | 0   | 0   | 0   | 1   | 0   | 1   | 5 (5)        |
| 0      | 0   | 0   | 0   | 1   | 1   | 0   | 6 (6)        |
| 0      | 0   | 0   | 0   | 1   | 1   | 1   | 7 (7)        |
| ...    | ... | ... | ... | ... | ... | ... | ...          |
| 1      | 1   | 1   | 1   | 1   | 1   | 1   | 8184 (17770) |
| 1      | 1   | 1   | 1   | 1   | 1   | 0   | 8185 (17771) |
| 1      | 1   | 1   | 1   | 1   | 0   | 1   | 8186 (17772) |
| 1      | 1   | 1   | 1   | 1   | 0   | 1   | 8187 (17773) |
| 1      | 1   | 1   | 1   | 1   | 0   | 0   | 8188 (17774) |
| 1      | 1   | 1   | 1   | 1   | 0   | 1   | 8189 (17775) |
| 1      | 1   | 1   | 1   | 1   | 1   | 0   | 8190 (17776) |
| 1      | 1   | 1   | 1   | 1   | 1   | 1   | 8191 (17777) |

\*0 - Even Parity  
1 - Odd Parity

Note: May redefine to suit application by manipulating W and/or other available D's

### LOGIC DIAGRAM



## ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS<sup>1</sup>

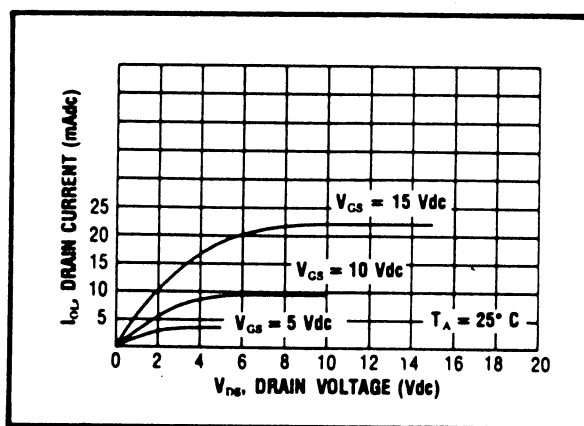
| PARAMETER                | V <sub>DD</sub><br>(Vdc) | CONDITIONS                                                                           | T <sub>LOW</sub> <sup>2</sup> |      | +25°C |      |      | T <sub>HIGH</sub> <sup>2</sup> |      | Units |
|--------------------------|--------------------------|--------------------------------------------------------------------------------------|-------------------------------|------|-------|------|------|--------------------------------|------|-------|
|                          |                          |                                                                                      | Min.                          | Max. | Min.  | Typ. | Max. | Min.                           | Max. |       |
| QUIESCENT DEVICE CURRENT | I <sub>DD</sub>          | V <sub>IN</sub> = V <sub>SS</sub> or V <sub>DD</sub><br>All valid input combinations | —                             | 5    | —     | 0.05 | 5    | —                              | 150  | μAdc  |
|                          |                          |                                                                                      | —                             | 10   | —     | 0.1  | 10   | —                              | 300  |       |
|                          |                          |                                                                                      | —                             | 20   | —     | 0.2  | 20   | —                              | 600  |       |

NOTES: <sup>1</sup> Remaining Static Electrical Characteristics are listed under "4000B Series Family Specifications".

<sup>2</sup> T<sub>LOW</sub> = -55°C for C  
= -40°C for E  
T<sub>HIGH</sub> = +125°C for C  
= + 85°C for E

DYNAMIC CHARACTERISTICS (C<sub>L</sub> = 50pF, T<sub>A</sub> = 25°C)

| PARAMETER                               |                                     | V <sub>DD</sub><br>(Vdc) | Min. | Typ. | Max. | Units |
|-----------------------------------------|-------------------------------------|--------------------------|------|------|------|-------|
| PROPAGATION DELAY TIME<br>From D Inputs | t <sub>PLH</sub> , t <sub>PHL</sub> | 5                        | —    | 420  | 840  | ns    |
|                                         |                                     | 10                       | —    | 175  | 350  |       |
|                                         |                                     | 15                       | —    | 120  | 240  |       |
|                                         | t <sub>PLH</sub> , t <sub>PHL</sub> | 5                        | —    | 250  | 500  | ns    |
|                                         |                                     | 10                       | —    | 100  | 200  |       |
|                                         |                                     | 15                       | —    | 70   | 140  |       |
| OUTPUT TRANSITION TIME                  | t <sub>TLH</sub> , t <sub>THL</sub> | 5                        | —    | 130  | 260  | ns    |
|                                         |                                     | 10                       | —    | 65   | 130  |       |
|                                         |                                     | 15                       | —    | 50   | 100  |       |
|                                         |                                     | —                        | —    | —    | —    |       |



Typical N-Channel  
Sink Current Characteristics