

# 100323 Low Power Hex Bus Driver

## General Description

The 100323 is a monolithic device containing six bus drivers capable of driving terminated lines with terminations as low as 25Ω. To reduce crosstalk, each output has its own respective ground connection. Transition times were designed to be longer than on other F100K devices. The driver itself performs the positive logic AND of a data input (D<sub>1</sub>-D<sub>6</sub>) and the OR of two select inputs (E and either DE<sub>1</sub>, DE<sub>2</sub>, or DE<sub>3</sub>).

Enabling of data is possible in multiples of two, i.e., 2, 4 or all 6 paths. All inputs have 50 kΩ pull-down resistors.

The output voltage LOW level is designed to be more negative than normal ECL outputs (cut off state). This allows an emitter-follower output transistor to turn OFF when the termination supply is -2.0V and thus present a high impedance to the data bus.

## Features

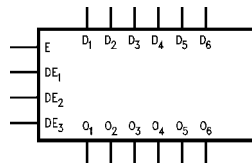
- 50% power reduction of the 100123
- 2000V ESD protection
- -4.2V to -5.7V operating range
- Drives 25Ω load

## Ordering Code:

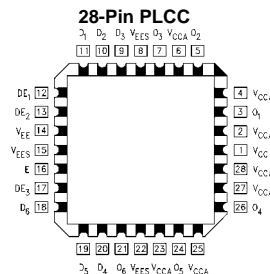
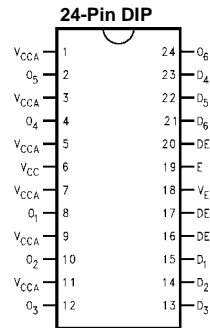
| Order Number | Package Number | Package Description   |
|--------------|----------------|---|
| 100323PC     | N24E           | 24-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-010, 0.400 Wide |
| 100323QC     | V28A           | 28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square  |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

## Logic Symbol



## Connection Diagrams



## Pin Descriptions

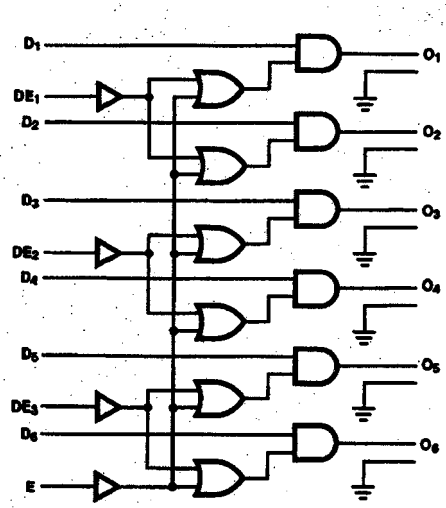
| Pin Names                        | Description         |
|----------------------------------|---------------------|
| D <sub>1</sub> -D <sub>6</sub>   | Data Inputs         |
| DE <sub>1</sub> -DE <sub>3</sub> | Dual Enable Inputs  |
| E                                | Common Enable Input |
| O <sub>1</sub> -O <sub>6</sub>   | Data Outputs        |

**Truth Table**

| E | DE <sub>n</sub> | D <sub>n</sub> | D <sub>n+1</sub> | O <sub>n</sub> | O <sub>n+1</sub> |
|---|-----------------|----------------|------------------|----------------|------------------|
| L | L               | X              | X                | Cutoff         | Cutoff           |
| X | H               | L              | L                | Cutoff         | Cutoff           |
| X | H               | L              | H                | Cutoff         | H                |
| X | H               | H              | L                | H              | Cutoff           |
| X | H               | H              | H                | H              | H                |
| H | X               | L              | L                | Cutoff         | Cutoff           |
| H | X               | L              | H                | Cutoff         | H                |
| H | X               | H              | L                | H              | Cutoff           |
| H | X               | H              | H                | H              | H                |

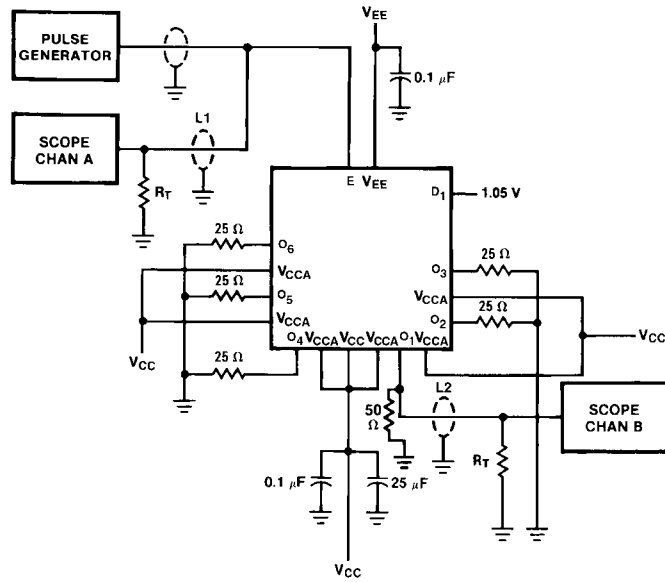
H = HIGH Voltage Level  
 L = LOW Voltage Level  
 X = Don't Care  
 Cutoff = Lower-than-LOW State

**Logic Diagram**



| Absolute Maximum Ratings (Note 1)   |                         |                          |      | Recommended Operating Conditions  |                |  |                           |       |              |
|---|-------------------------|--------------------------|------|-----------------------------------|----------------|--|---------------------------|-------|--------------|
| Storage Temperature   |                         | -65°C to +150°C          |      | Case Temperature                  | 0°C to +85°C   |  |                           |       |              |
| Maximum Junction Temperature  |                         | +150°C                   |      | Supply Voltage (V <sub>EE</sub> ) | -5.7V to -4.2V |  |                           |       |              |
| V <sub>EE</sub> Pin Potential to Ground Pin   |                         | -7.0V to +0.5V           |      |                                   |                |  |                           |       |              |
| Input Voltage (DC)  |                         | V <sub>EE</sub> to +0.5V |      |                                   |                |  |                           |       |              |
| Output Current (DC Output High)   |                         | -50 mA                   |      |                                   |                |  |                           |       |              |
| ESD   |                         | ≥2000V                   |      |                                   |                |  |                           |       |              |
| <p><b>Note 1:</b> The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum rating. The "Recommended Operating Conditions" table will define the conditions for actual device operation.</p> <p><b>Note 2:</b> ESD testing conforms to MIL-STD-883, Method 3015.</p> |                         |                          |      |                                   |                |  |                           |       |              |
| DC Electrical Characteristics (Note 3)  |                         |                          |      |                                   |                |  |                           |       |              |
| V <sub>EE</sub> = -4.2V to -5.7V, V <sub>CC</sub> = V <sub>CCA</sub> = GND, T <sub>C</sub> = 0°C to +85°C   |                         |                          |      |                                   |                |  |                           |       |              |
| Symbol  | Parameter               | Min                      | Typ  | Max                               | Units          | Conditions   |                           |       |              |
| V <sub>IH</sub>   | Input HIGH Voltage      | -1165                    |      | -870                              | mV             | Guaranteed High Signal for ALL Inputs                            |                           |       |              |
| V <sub>IL</sub>   | Input LOW Voltage       | -1830                    |      | -1475                             | mV             | Guaranteed Low Signal for ALL Inputs                             |                           |       |              |
| V <sub>OH</sub>   | Output HIGH Voltage     | -1025                    | -955 | -870                              | mV             | V <sub>IN</sub> = V <sub>IH (max)</sub> or V <sub>IL (min)</sub> | Loading with 25Ω to -2.0V |       |              |
| V <sub>OHC</sub>  | Output HIGH Voltage     | -1035                    |      |                                   | mV             | V <sub>IN</sub> = V <sub>IH (min)</sub> or V <sub>IL (max)</sub> | Loading with 25Ω to -2.0V |       |              |
| V <sub>OLZ</sub>  | Cut-Off LOW Voltage     |                          |      | -1950                             | mV             | V <sub>IN</sub> = V <sub>IH (min)</sub> or V <sub>IL (max)</sub> | Loading with 25Ω to -2.0V |       |              |
| I <sub>IL</sub>   | Input LOW Current       | 0.50                     |      |                                   | μA             | V <sub>IN</sub> = V <sub>IL (min)</sub>                          |                           |       |              |
| I <sub>IH</sub>   | Input HIGH Current      |                          |      | 240                               | μA             | V <sub>IN</sub> = V <sub>IH (max)</sub>                          |                           |       |              |
| I <sub>EE</sub>   | Power Supply Current    | -121                     | -91  | -57                               | mA             | Inputs Open  |                           |       |              |
| <p><b>Note 3:</b> The specified limits represent "worst case" values for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guardbanding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.</p>  |                         |                          |      |                                   |                |  |                           |       |              |
| DIP AC Electrical Characteristics (Note 4)  |                         |                          |      |                                   |                |  |                           |       |              |
| V <sub>EE</sub> = -4.2V to -5.7V, V <sub>CC</sub> = V <sub>CCA</sub> = GND  |                         |                          |      |                                   |                |  |                           |       |              |
| Symbol  | Parameter               | T <sub>C</sub> = 0°C     |      | T <sub>C</sub> = +25°C            |                | T <sub>C</sub> = +85°C   |                           | Units | Conditions   |
|   |                         | Min                      | Max  | Min                               | Max            | Min  | Max                       |       |              |
| t <sub>PZH</sub>  | Propagation Delay       | 1.90                     | 3.60 | 1.90                              | 3.60           | 2.00   | 3.80                      | ns    | Figures 1, 2 |
| t <sub>PHZ</sub>  | Data to Output          | 1.30                     | 2.70 | 1.30                              | 2.70           | 1.50   | 2.70                      |       |              |
| t <sub>PZH</sub>  | Propagation Delay       | 1.90                     | 3.60 | 1.90                              | 3.60           | 2.00   | 3.90                      | ns    |              |
| t <sub>PHZ</sub>  | Dual Enable to Output   | 1.60                     | 3.00 | 1.60                              | 3.00           | 1.70   | 3.40                      |       |              |
| t <sub>PZH</sub>  | Propagation Delay       | 1.80                     | 3.50 | 1.80                              | 3.50           | 2.00   | 3.80                      | ns    |              |
| t <sub>PHZ</sub>  | Common Enable to Output | 1.50                     | 2.90 | 1.50                              | 2.90           | 1.60   | 3.00                      |       |              |
| t <sub>TZH</sub>  | Transition Time         | 0.50                     | 1.80 | 0.50                              | 1.80           | 0.50   | 1.80                      | ns    |              |
| t <sub>THZ</sub>  | 20% to 80%, 80% to 20%  | 0.35                     | 1.40 | 0.35                              | 1.40           | 0.35   | 1.40                      |       |              |
| <p><b>Note 4:</b> The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guard banding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.</p>  |                         |                          |      |                                   |                |  |                           |       |              |
| PLCC AC Electrical Characteristics (Note 5)   |                         |                          |      |                                   |                |  |                           |       |              |
| V <sub>EE</sub> = -4.2V to -5.7V, V <sub>CC</sub> = V <sub>CCA</sub> = GND  |                         |                          |      |                                   |                |  |                           |       |              |
| Symbol  | Parameter               | T <sub>C</sub> = 0°C     |      | T <sub>C</sub> = +25°C            |                | T <sub>C</sub> = +85°C   |                           | Units | Conditions   |
|   |                         | Min                      | Max  | Min                               | Max            | Min  | Max                       |       |              |
| t <sub>PZH</sub>  | Propagation Delay       | 1.90                     | 3.40 | 1.90                              | 3.40           | 2.00   | 3.60                      | ns    | Figures 1, 2 |
| t <sub>PHZ</sub>  | Data to Output          | 1.30                     | 2.50 | 1.30                              | 2.50           | 1.50   | 2.70                      |       |              |
| t <sub>PZH</sub>  | Propagation Delay       | 1.90                     | 3.40 | 1.90                              | 3.40           | 2.00   | 3.70                      | ns    |              |
| t <sub>PHZ</sub>  | Dual Enable to Output   | 1.60                     | 2.80 | 1.60                              | 2.80           | 1.70   | 3.00                      |       |              |
| t <sub>PZH</sub>  | Propagation Delay       | 1.80                     | 3.30 | 1.80                              | 3.30           | 2.00   | 3.60                      | ns    |              |
| t <sub>PHZ</sub>  | Common Enable to Output | 1.50                     | 2.70 | 1.50                              | 2.70           | 1.60   | 2.80                      |       |              |
| t <sub>TZH</sub>  | Transition Time         | 0.50                     | 1.70 | 0.50                              | 1.70           | 0.50   | 1.70                      | ns    |              |
| t <sub>THZ</sub>  | 20% to 80%, 80% to 20%  | 0.35                     | 1.30 | 0.35                              | 1.20           | 0.35   | 1.30                      |       |              |
| <p><b>Note 5:</b> The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guard banding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.</p>  |                         |                          |      |                                   |                |  |                           |       |              |

### Test Circuitry



**Note:**

- $V_{CC}, V_{CCA} = +2V, V_{EE} = -2.5V$
- L1 and L2 = equal length 50Ω impedance lines
- $R_T = 50\Omega$  terminator internal to scope
- Decoupling 0.1 μF from GND to  $V_{CC}$  and  $V_{EE}$
- All unused outputs are loaded with 25Ω to GND
- $C_L$  = Fixture and stray capacitance  $\leq 3$  pF
- Pin numbers shown are for flatpak; for DIP see logic symbol

FIGURE 1. AC Test Circuit

### Timing Waveform

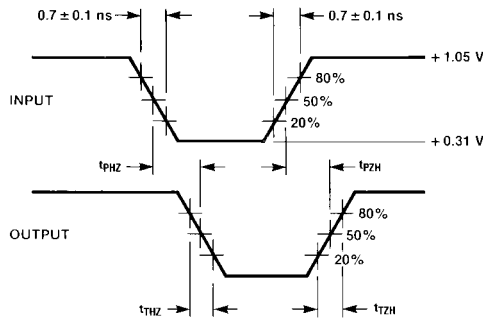
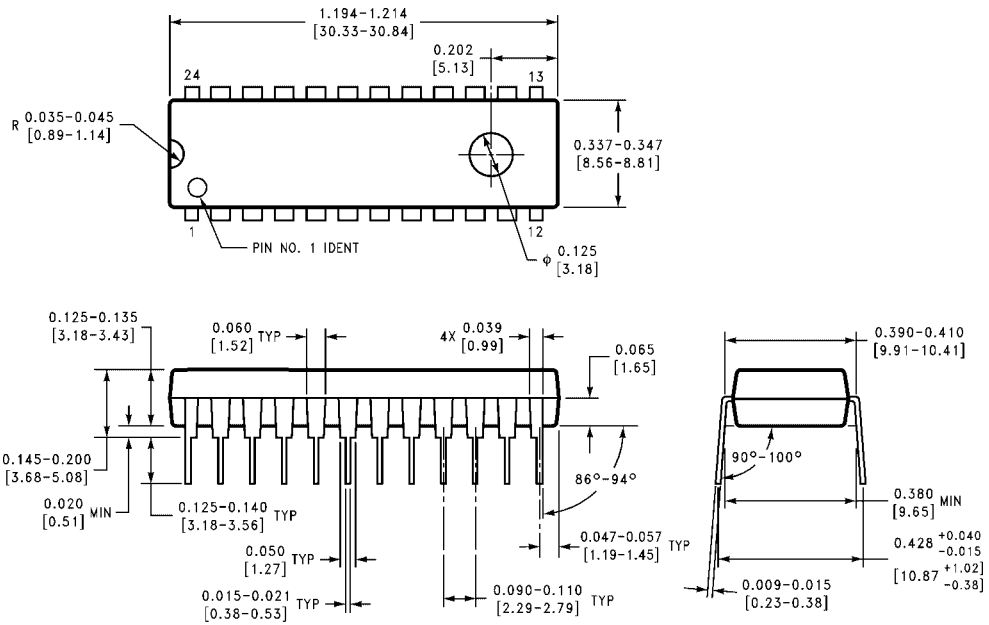


FIGURE 2. Propagation Delay and Transition Times

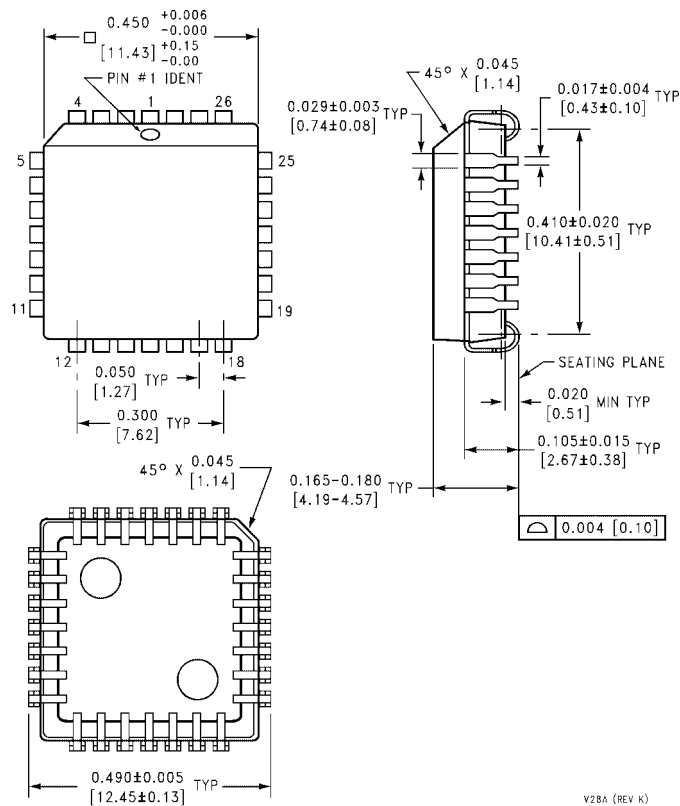
**Physical Dimensions** inches (millimeters) unless otherwise noted



**24-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-010, 0.400 Wide  
Package Number N24E**

N24E (REV A)

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



**28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square Package Number V28A**

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