

## DM7123 Quad 2-Input Data Selectors/Multiplexers

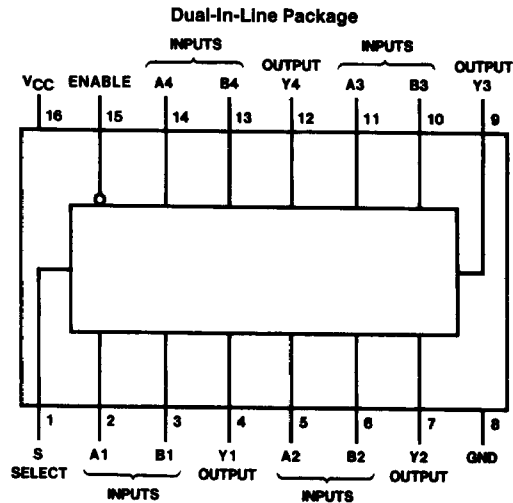
### General Description

This device contains four 2-input multiplexers with common input select logic and common output disable circuitry. The DM7123 provides TRI-STATE® outputs. When the enable/strobe input is at a low logic level, the outputs of all devices are conventional TTL. However, when the enable/strobe input is raised to a high logic level, the outputs of the DM7123 go to the high-impedance third state. This device provides the designer with TRI-STATE and/or low power pin/pin replacements for the popular DM9322 and DM54/DM74157 multiplexers.

### Features

- Pin equivalents popular DM9322 and DM54/DM74157 multiplexers
- Both conventional TTL and TRI-STATE outputs available
- Typical propagation delay 9.5 ns
- Typical power dissipation 200 mW

### Connection Diagram



Order Number DM7123J or DM7123W  
See NS Package Number J16A or W16A

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### Function Table

| Enable | Select | Inputs |   | Outputs<br>Y |
|--------|--------|--------|---|--------------|
|        |        | A      | B |              |
| L      | L      | L      | X | L            |
| L      | L      | H      | X | H            |
| L      | H      | X      | L | L            |
| L      | H      | X      | H | H            |
| H      | X      | X      | X | Hi-Z         |

L = Low Logic Level, H = High Logic Level  
X = Either Low or High Logic Level  
Hi-Z = TRI-STATE (Outputs are disabled)

## Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

|  |                 |
|--|-----------------|
| Supply Voltage                               | 7V              |
| Input Voltage                                | 5.5V            |
| Operating Free Air Temperature Range<br>DM71 | -55°C to +125°C |
| Storage Temperature Range                    | -65°C to +150°C |

Note: 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" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

## Recommended Operating Conditions

| Symbol          | Parameter                      | DM7123 |     |     | Units |
|-----------------|--------------------------------|--------|-----|-----|-------|
|                 |                                | Min    | Nom | Max |       |
| V <sub>CC</sub> | Supply Voltage                 | 4.5    | 5   | 5.5 | V     |
| V <sub>IH</sub> | High Level Input Voltage       | 2      |     |     | V     |
| V <sub>IL</sub> | Low Level Input Voltage        |        |     | 0.8 | V     |
| I <sub>OH</sub> | High Level Output Current      |        |     | -2  | mA    |
| I <sub>OL</sub> | Low Level Output Current       |        |     | 16  | mA    |
| T <sub>A</sub>  | Free Air Operating Temperature | -55    |     | 125 | °C    |

## Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

| Symbol           | Parameter   | Conditions   | Min | Typ<br>(Note 1) | Max  | Units |
|------------------|---|--|-----|-----------------|------|-------|
| V <sub>I</sub>   | Input Clamp Voltage   | V <sub>CC</sub> = Min, I <sub>I</sub> = -12 mA   |     |                 | -1.5 | V     |
| V <sub>OH</sub>  | High Level Output Voltage                                       | V <sub>CC</sub> = Min, I <sub>OH</sub> = Max<br>V <sub>IL</sub> = Max, V <sub>IH</sub> = Min | 2.4 |                 |      | V     |
| V <sub>OL</sub>  | Low Level Output Voltage  | V <sub>CC</sub> = Min, I <sub>OL</sub> = Max<br>V <sub>IH</sub> = Min, V <sub>IL</sub> = Max |     |                 | 0.4  | V     |
| I <sub>I</sub>   | Input Current @ Max Input Voltage                               | V <sub>CC</sub> = Max, V <sub>I</sub> = 5.5V   |     |                 | 1    | mA    |
| I <sub>IH</sub>  | High Level Input Current  | V <sub>CC</sub> = Max, V <sub>I</sub> = 2.4V   |     |                 | 40   | μA    |
| I <sub>IL</sub>  | Low Level Input Current   | V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V   |     |                 | -1.6 | mA    |
| I <sub>OZH</sub> | Off-State Output Current with High Level Output Voltage Applied | V <sub>CC</sub> = Max, V <sub>O</sub> = 2.4V<br>V <sub>IH</sub> = Min, V <sub>IL</sub> = Max |     |                 | 40   | μA    |
| I <sub>OZL</sub> | Off-State Output Current with Low Level Output Voltage Applied  | V <sub>CC</sub> = Max, V <sub>O</sub> = 0.4V<br>V <sub>IH</sub> = Min, V <sub>IL</sub> = Max |     |                 | -40  | μA    |
| I <sub>OS</sub>  | Short Circuit Output Current                                    | V <sub>CC</sub> = Max<br>(Note 2)  | -30 |                 | -70  | mA    |
| I <sub>CC</sub>  | Supply Current  | V <sub>CC</sub> = Max (Note 3)   |     | 40              | 51   | mA    |

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

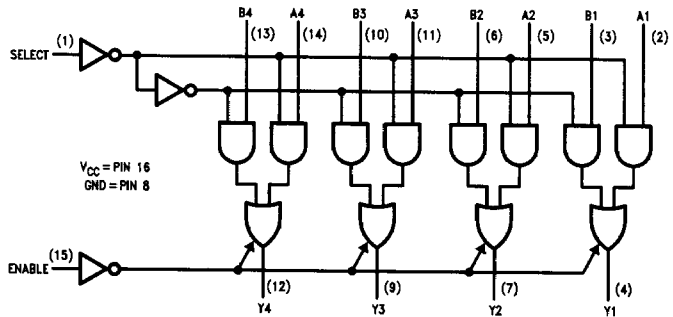
Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I<sub>CC</sub> is measured with the inputs grounded, and all outputs open.

**Switching Characteristics** at  $V_{CC} = 5V$  and  $T_A = 25^\circ C$  (See Section 1 for Test Waveforms and Output Load)

| Symbol    | Parameter  | From (Input)<br>To (Output) | $R_L = 400\Omega$   |     |                      |     | Units |
|-----------|--|-----------------------------|---------------------|-----|----------------------|-----|-------|
|           |  |                             | $C_L = 5\text{ pF}$ |     | $C_L = 50\text{ pF}$ |     |       |
|           |  |                             | Min                 | Max | Min                  | Max |       |
| $t_{PLH}$ | Propagation Delay Time<br>Low to High Level Output | Data to<br>Output           |                     |     | 4                    | 15  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>High to Low Level Output | Data to<br>Output           |                     |     | 5                    | 18  | ns    |
| $t_{PLH}$ | Propagation Delay Time<br>Low to High Level Output | Select to<br>Output         |                     |     | 5                    | 23  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>High to Low Level Output | Select to<br>Output         |                     |     | 8                    | 24  | ns    |
| $t_{PZH}$ | Output Enable Time to<br>High Level Output         | Enable<br>to Q              |                     |     | 9                    | 25  | ns    |
| $t_{PZL}$ | Output Enable Time to<br>Low Level Output          | Enable<br>to Q              |                     |     | 10                   | 30  | ns    |
| $t_{PHZ}$ | Output Disable Time from<br>High Level Output      | Enable<br>to Q              | 4                   | 11  |                      |     | ns    |
| $t_{PLZ}$ | Output Disable Time from<br>Low Level Output       | Enable<br>to Q              | 9                   | 27  |                      |     | ns    |

**Logic Diagram**



TL/F/6574-2