FAIRCHILD SEMICONDUCTOR™

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# DM74S151
# 1-of-8 Data Selector/Multiplexer with Complementary Outputs

## General Description

These data selectors/multiplexers contain full on-chip decoding to select the desired data source. The DM74S151 selects one-of-eight data sources. The DM74S151 has a strobe input which must be at a low logic level to enable these devices. A high level at the strobe forces the W output HIGH and the Y output LOW.

The DM74S151 features complementary W and Y outputs.

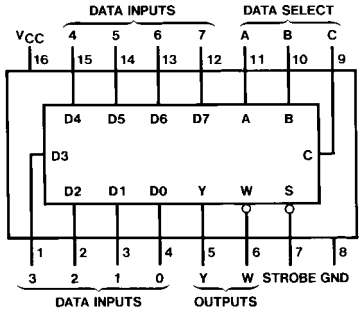
## Features

- Select one-of-eight data lines
- Performs parallel-to-serial conversion
- Permits multiplexing from N lines to one line
- Also for use as Boolean function generator
- Typical average propagation delay time, data input to W output 4.5 ns
- Typical power dissipation 225 mW

## Ordering Code:

| Order Number | Package Number | Package Description |
|---|---|---|
| DM74S151N | N16E | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

## Connection Diagram



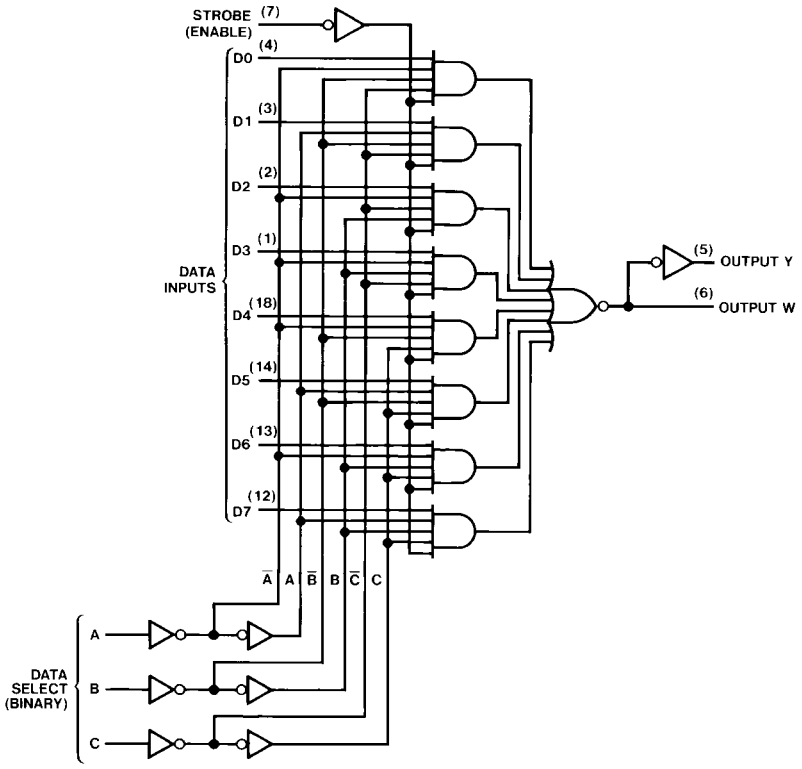

## Function Table

| Inputs | | | | Outputs | |
|---|---|---|---|---|---|
| Select | | | Strobe | Y | W |
| C | B | A | S | | |
| X | X | X | H | L | H |
| L | L | L | L | D0 | $\overline{D0}$ |
| L | L | H | L | D1 | $\overline{D1}$ |
| L | H | L | L | D2 | $\overline{D2}$ |
| L | H | H | L | D3 | $\overline{D3}$ |
| H | L | L | L | D4 | $\overline{D4}$ |
| H | L | H | L | D5 | $\overline{D5}$ |
| H | H | L | L | D6 | $\overline{D6}$ |
| H | H | H | L | D7 | $\overline{D7}$ |

H = HIGH Level
L = LOW Level
X = Don't Care
D0, D1…D7 = The level of the respective D input

## Logic Diagram



## Absolute Maximum Ratings(Note 1)

| | |
|---|---|
| Supply Voltage | 7V |
| Input Voltage | 5.5V |
| Operating Free Air Temperature Range | 0°C to +70°C |
| Storage Temperature Range | −65°C to +150°C |

**Note 1:** 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 ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

## Recommended Operating Conditions

| Symbol | Parameter | Min | Nom | Max | Units |
|---|---|---|---|---|---|
| $V_{CC}$ | Supply Voltage | 4.75 | 5 | 5.25 | V |
| $V_{IH}$ | HIGH Level Input Voltage | 2 | | | V |
| $V_{IL}$ | LOW Level Input Voltage | | | 0.8 | V |
| $I_{OH}$ | HIGH Level Output Current | | | −1 | mA |
| $I_{OL}$ | LOW Level Output Current | | | 20 | mA |
| $T_A$ | Free Air Operating Temperature | 0 | | 70 | °C |

## Electrical Characteristics

over recommended operating free air temperature (unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ (Note 2) | Max | Units |
|---|---|---|---|---|---|---|
| $V_I$ | Input Clamp Voltage | $V_{CC}$ = Min, $I_I$ = −18 mA | | | −1.2 | V |
| $V_{OH}$ | HIGH Level Output Voltage | $V_{CC}$ = Min, $I_{OH}$ = Max, $V_{IL}$ = Max, $V_{IH}$ = Min | 2.7 | 3.4 | | V |
| $V_{OL}$ | LOW Level Output Voltage | $V_{CC}$ = Min, $I_{OL}$ = Max $V_{IH}$ = Min, $V_{IL}$ = Max | | | 0.5 | V |
| $I_I$ | Input Current @ Max Input Voltage | $V_{CC}$ = Max, $V_I$ = 5.5V | | | 1 | mA |
| $I_{IH}$ | HIGH Level Input Current | $V_{CC}$ = Max, $V_I$ = 2.7V | | | 50 | µA |
| $I_{IL}$ | LOW Level Input Current | $V_{CC}$ = Max, $V_I$ = 0.5V | | | −2 | mA |
| $I_{OS}$ | Short Circuit Output Current | $V_{CC}$ = Max (Note 3) | −40 | | −100 | mA |
| $I_{CC}$ | Supply Current | $V_{CC}$ = Max (Note 4) | | 45 | 70 | mA |

**Note 2:** All typicals are at $V_{CC}$ = 5V, $T_A$ = 25°C.

**Note 3:** Not more than one output should be shorted at a time, and the duration should not exceed one second.

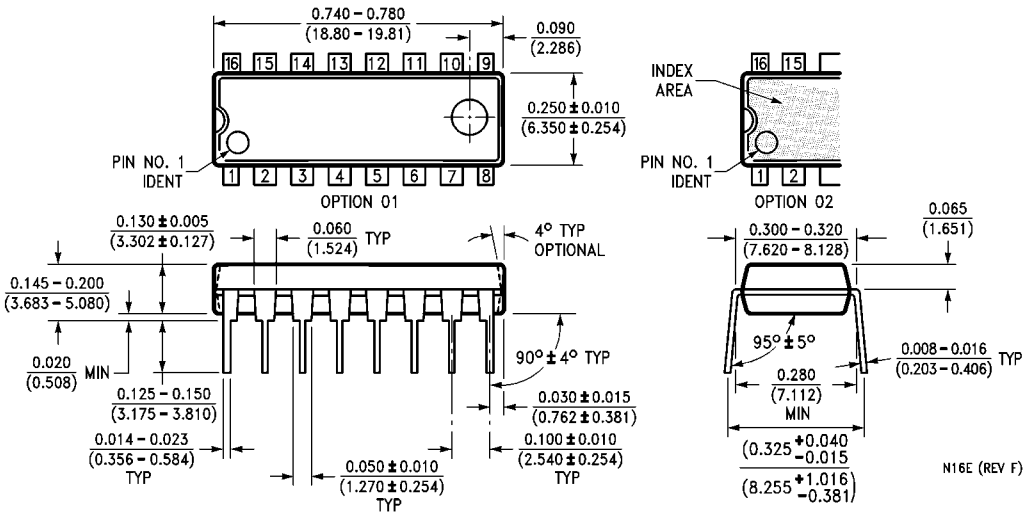
**Note 4:** $I_{CC}$ is measured with the strobe and data select inputs at 4.5V, all other inputs and outputs OPEN.

## Switching Characteristics

at $V_{CC}$ = 5V and $T_A$ = 25°C

| Symbol | Parameter | From (Input) To (Output) | $R_L$ = 280Ω | | | | Units |
|---|---|---|---|---|---|---|---|
| | | | $C_L$ = 15 pF | | $C_L$ = 50 pF | | |
| | | | Min | Max | Min | Max | |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | Select to Y (4 Levels) | | 18 | | 21 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | Select to Y (4 Levels) | | 18 | | 21 | ns |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | Select to W (3 Levels) | | 15 | | 18 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | Select to W (3 Levels) | | 13.5 | | 17 | ns |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | Strobe to Y | | 16.5 | | 19 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | Strobe to Y | | 18 | | 21 | ns |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | Strobe to W | | 13 | | 16 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | Strobe to W | | 12 | | 16 | ns |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | D0 thru D7 to Y | | 12 | | 15 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | D0 thru D7 to Y | | 12 | | 15 | ns |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | D0 thru D7 to W | | 7 | | 9 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | D0 thru D7 to W | | 7 | | 10 | ns |

## Physical Dimensions inches (millimeters) unless otherwise noted

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**Package Number N16E**