FAIRCHILD SEMICONDUCTOR™

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# DM74ALS251
# 3-STATE 1-of-8 Line Data Selector/Multiplexer

## General Description

This Data Selector/Multiplexer contains full on-chip decoding to select one-of-eight data sources as a result of a unique three-bit binary code at the Select inputs. Two complementary outputs provide both inverting and non-inverting buffer operation. An Output Control input is provided which, when at the high level, places both outputs in the high impedance OFF-State. In order to prevent bus access conflicts, output disable times are shorter than output enable times. The Select input buffers incorporate internal overlap features to ensure that select input changes do not cause invalid output transients.

## Features

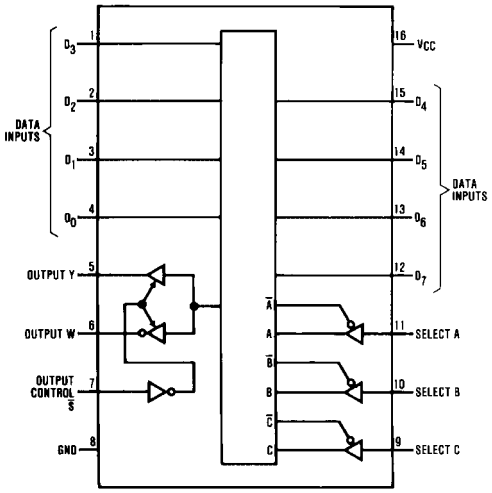
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Switching performance is guaranteed over full temperature and $V_{CC}$ supply range
- Pin and functional compatible with LS family counterpart
- Improved output transient handling capability
- Output control circuitry incorporates power-up 3-STATE feature

## Ordering Code:

| Order Number | Package Number | Package Description |
|---|---|---|
| DM74ALS251M | M16A | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74ALS251SJ | M16D | 16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| DM74ALS251N | N16E | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

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

## Connection Diagram



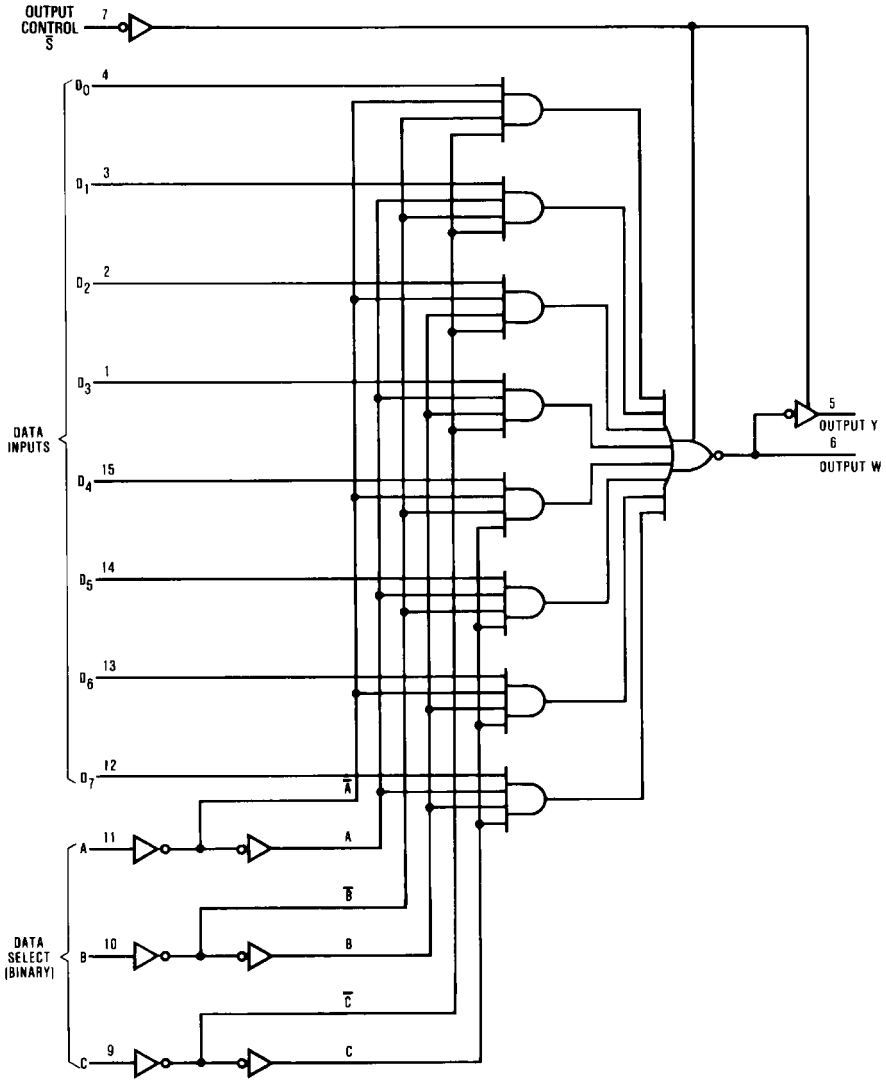

## Function Table

| Inputs | | | | Outputs | |
|---|---|---|---|---|---|
| Select | | | Strobe | | |
| C | B | A | $\overline{S}$ | Y | W |
| X | X | X | H | Z | Z |
| L | L | L | L | $D_0$ | $\overline{D}_0$ |
| L | L | H | L | $D_1$ | $\overline{D}_1$ |
| L | H | L | L | $D_2$ | $\overline{D}_2$ |
| L | H | H | L | $D_3$ | $\overline{D}_3$ |
| H | L | L | L | $D_4$ | $\overline{D}_4$ |
| H | L | H | L | $D_5$ | $\overline{D}_5$ |
| H | H | L | L | $D_6$ | $\overline{D}_6$ |
| H | H | H | L | $D_7$ | $\overline{D}_7$ |

H = HIGH Level
L = LOW Level
X = Don't Care
Z = High Impedance (OFF)
D0 thru D7 = The Level of the Respective D Input

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## Logic Diagram



## Absolute Maximum Ratings(Note 1)

| | |
|---|---|
| Supply Voltage, $V_{CC}$ | 7V |
| Input Voltage | 7V |
| Voltage Applied to Disabled Output | 5.5V |
| Operating Free Air Temperature Range | 0°C to +70°C |
| Storage Temperature Range | −65°C to +150°C |
| Typical $\theta_{JA}$ | |
| N Package | 78.0°C/W |
| M Package | 107.0°C/W |

**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 | 4.5 | 5 | 5.5 | V |
| $V_{IH}$ | HIGH Level Input Voltage | 2 | | | V |
| $V_{IL}$ | LOW Level Input Voltage | | | 0.8 | V |
| $I_{OH}$ | HIGH Level Output Current | | | −2.6 | mA |
| $I_{OL}$ | LOW Level Output Current | | | 24 | mA |
| $T_A$ | Free Air Operating Temperature | 0 | | 70 | °C |

## Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at $V_{CC}$ = 5V, $T_A$ = 25°C.

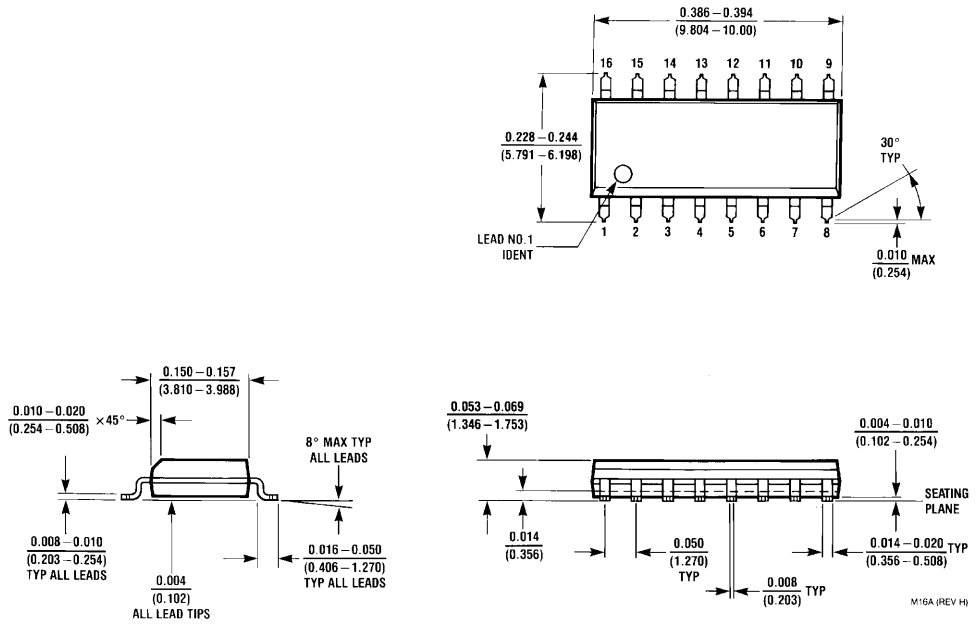
| Symbol | Parameter | Conditions | | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|
| $V_{IK}$ | Input Clamp Voltage | $V_{CC}$ = 4.5V, $I_{IN}$ = −18 mA | | | | −1.5 | V |
| $V_{OH}$ | HIGH Level Output Voltage | $V_{CC}$ = 4.5V, $I_{OH}$ = Max | | 2.4 | 3.2 | | V |
| | | $I_{OH}$ = −400 µA, $V_{CC}$ = 4.5V to 5.5V | | $V_{CC}$−2 | | | V |
| $V_{OL}$ | LOW Level Output Voltage | $V_{CC}$ = 4.5V | $I_{OL}$ = 24 mA | | 0.35 | 0.5 | V |
| $I_I$ | Input Current at Maximum Input Voltage | $V_{CC}$ = 5.5V, $V_{IH}$ = 7V | | | | 0.1 | mA |
| $I_{IH}$ | HIGH Level Input Current | $V_{CC}$ = 5.5V, $V_{IH}$ = 2.7V | | | | 20 | µA |
| $I_{IL}$ | LOW Level Input Current | $V_{CC}$ = 5.5V, $V_{IN}$ = 0.4V | | | | −0.1 | mA |
| $I_O$ | Output Drive Current | $V_{CC}$ = 5.5V, $V_{OUT}$ = 2.25V | | −30 | | −112 | mA |
| $I_{OZH}$ | OFF-State Output Current, HIGH Bias | $V_{CC}$ = 5.5V, $V_{OUT}$ = 2.7V | | | | 20 | µA |
| $I_{OZL}$ | OFF-State Output Current, LOW Bias | $V_{CC}$ = 5.5V, $V_{OUT}$ = 0.4V | | | | −20 | µA |
| $I_{CC}$ | Supply Current | $V_{CC}$ = 5.5V, Inputs = GND | Enabled | | 7 | 10 | mA |
| | | Inputs = 4.5V, $V_{CC}$ = 5.5V | Disabled | | 9.4 | 14 | |

## Switching Characteristics

over recommended operating free air temperature range

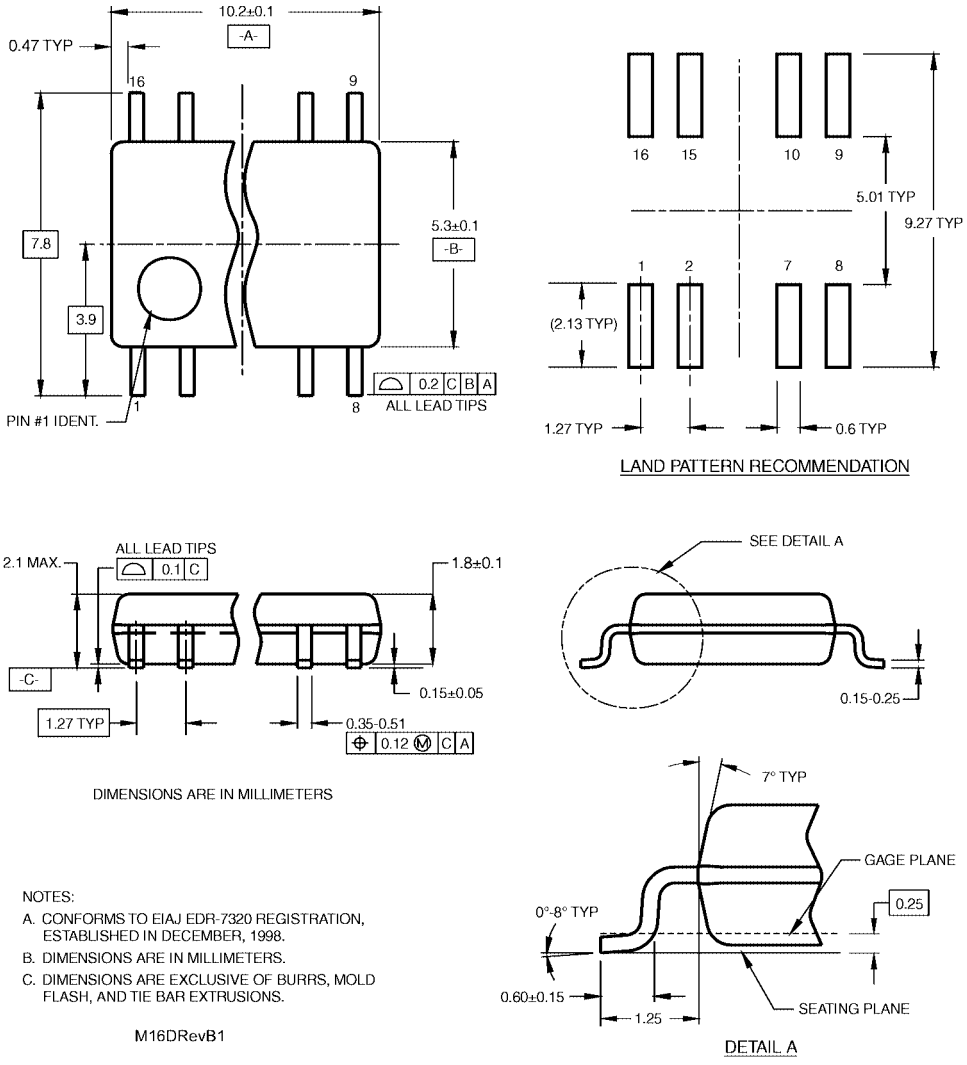
| Symbol | Parameter | Conditions | From | To | Min | Max | Units |
|---|---|---|---|---|---|---|---|
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | $V_{CC}$ = 4.5V to 5.5V<br>$C_L$ = 50 pF<br>$R_L$ = 500Ω | Select | Y | 5 | 18 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | | Select | | 8 | 24 | ns |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | | Select | W | 8 | 24 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | | Select | | 7 | 23 | ns |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | | Data | Y | 2 | 10 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | | Data | | 3 | 15 | ns |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | | Data | W | 3 | 15 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | | Data | | 3 | 15 | ns |
| $t_{PZH}$ | Output Enable Time to HIGH Level | | Output Control | Y | 3 | 15 | ns |
| $t_{PZL}$ | Output Enable Time to LOW Level | | Output Control | | 3 | 15 | ns |
| $t_{PZH}$ | Output Enable Time to HIGH Level | | Output Control | W | 3 | 15 | ns |
| $t_{PZL}$ | Output Enable Time to LOW Level | | Output Control | | 3 | 15 | ns |
| $t_{PHZ}$ | Output Disable Time from HIGH Level | | Output Control | Y | 2 | 10 | ns |
| $t_{PLZ}$ | Output Disable Time from LOW Level | | Output Control | | 1 | 10 | ns |
| $t_{PHZ}$ | Output Disable Time from HIGH Level | | Output Control | W | 2 | 10 | ns |
| $t_{PLZ}$ | Output Disable Time from LOW Level | | Output Control | | 1 | 10 | ns |

## Physical Dimensions inches (millimeters) unless otherwise noted




**16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow**
**Package Number M16A**

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




NOTES:

A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.

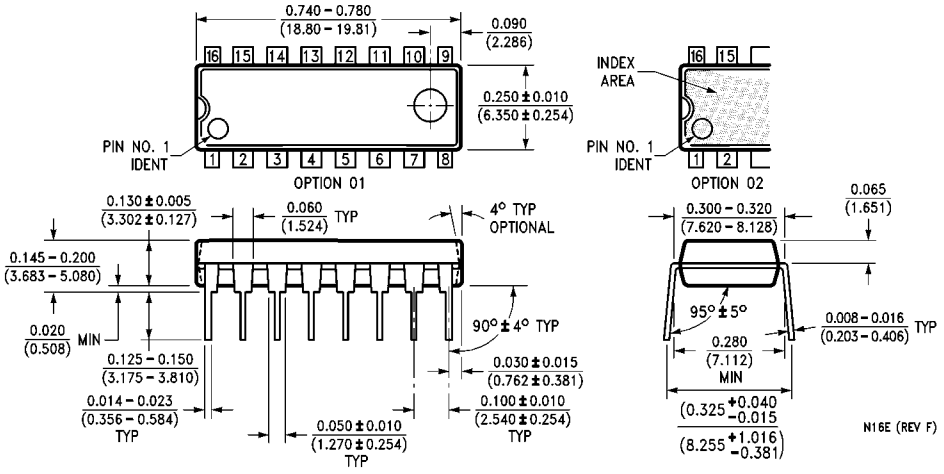
B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M16DRevB1

**16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide**
**Package Number M16D**

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




**16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide**
**Package Number N16E**

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