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DM74ALS257, DM74ALS258

3-STATE Quad 1-of-2-Line Data Selector/Multiplexer

Features

- Switching specifications at 50pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky and low power Schottky TTL counterpart
- Improved AC performance over Schottky and low power Schottky counterparts
- 3-STATE buffer-type outputs drive bus lines directly
- Expand any data input point
- Multiplex dual data buses
- General four functions of two variables (one variable is common)
- Source programmable counters

General Description

These data selectors/multiplexers contain inverters and drivers to supply full on-chip data selection to the four 3-STATE outputs that can interface directly with data lines of bus-organized systems. A 4-bit word selected from one of two sources is routed to the four outputs. The DM74ALS257 presents true data whereas the DM74ALS258 presents inverted data to minimize propagation delay time.

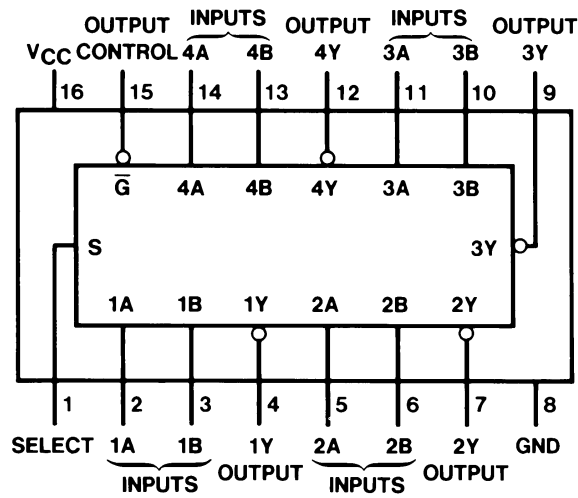
This 3-STATE output feature means that n-bit (paralleled) data selectors with up to 258 sources can be implemented for data buses. It also permits the use of standard TTL registers for data retention throughout the system.

Ordering Information

| Order Number | Package Number | Package Description |
|--------------|----------------|--|
| DM74ALS257M | M16A | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |
| DM74ALS257SJ | M16D | 16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| DM74ALS258M | M16A | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |

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

Connection Diagram

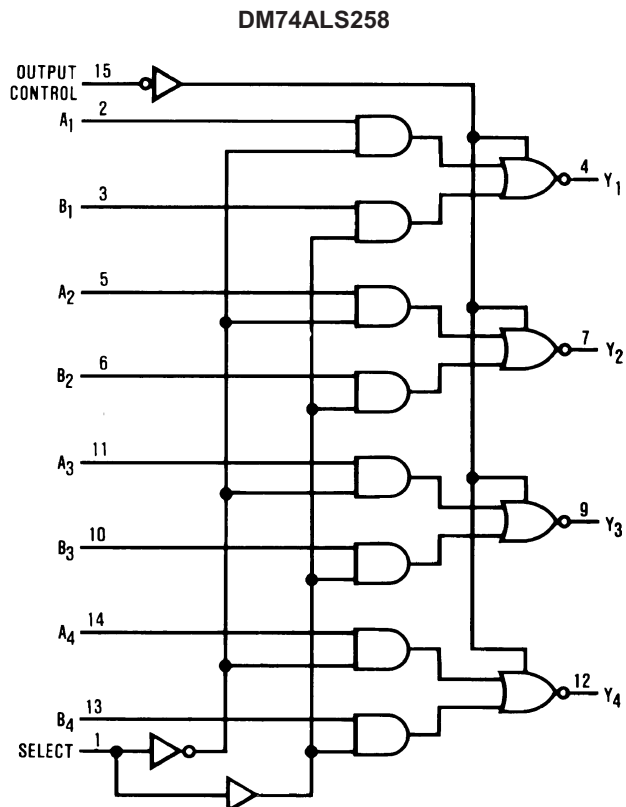
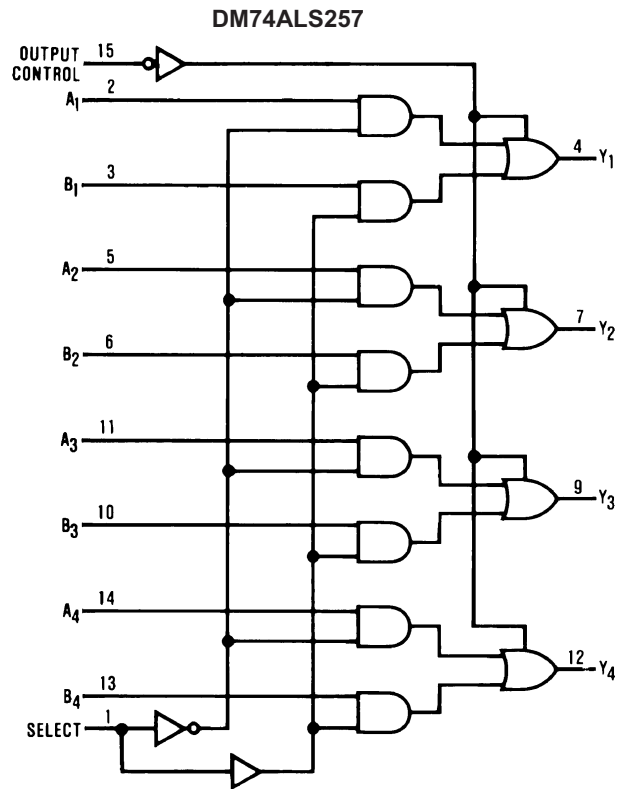


Function Table

| Inputs | | | | Output Y | |
|----------------|--------|---|---|------------|------------|
| Output Control | Select | A | B | DM74ALS257 | DM74ALS258 |
| H | X | X | X | Z | Z |
| L | L | L | X | L | H |
| L | L | H | X | H | L |
| L | H | X | L | L | H |
| L | H | X | H | H | L |

H = HIGH Level
L = LOW Level
X = Don't Care
Z = High Impedance (OFF)

Logic Diagrams



Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

| Symbol | Parameter | Rating |
|---------------|--------------------------------------|-----------------|
| V_{CC} | Supply Voltage | 7V |
| V_I | Input Voltage | 7V |
| | Voltage Applied to Disabled Output | 5.5V |
| T_A | Operating Free Air Temperature Range | 0°C to +70°C |
| T_{STG} | Storage Temperature Range | –65°C to +150°C |
| θ_{JA} | Typical Thermal Resistance | 102.0°C/W |

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

| 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 $V_{CC} = 5V$, $T_A = 25^\circ C$.

| Symbol | Parameter | | Conditions | Min. | Typ. | Max. | Units |
|-----------|--|------------|-------------------------------------|--------------|------|------|---------|
| V_{IK} | Input Clamp Voltage | | $V_{CC} = 4.5V$, $I_I = -18mA$ | | | -1.5 | V |
| V_{OH} | HIGH Level Output Voltage | | $V_{CC} = 4.5V$, $I_{OH} = -2.6mA$ | 2.4 | 3.3 | | V |
| | | | $I_{OH} = -0.4mA$ | $V_{CC} - 2$ | | | |
| V_{OL} | LOW Level Output Voltage | | $V_{CC} = 4.5V$, $I_{OL} = 12mA$ | | 0.25 | 0.4 | V |
| | | | $I_{OL} = 24mA$ | | 0.35 | 0.5 | |
| 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 | | $V_{CC} = 5.5V$, $V_{IL} = 0.4V$ | | | -0.1 | mA |
| I_O | Output Drive Current | | $V_{CC} = 5.5V$, $V_O = 2.25V$ | -30 | | -112 | mA |
| I_{OZH} | OFF-State Output Current, HIGH Level Voltage Applied | | $V_{CC} = 5.5V$, $V_O = 2.7V$ | | | 20 | μA |
| I_{OZL} | OFF-State Output Current, LOW Level Voltage Applied | | $V_{CC} = 5.5V$, $V_O = 0.4V$ | | | -20 | μA |
| I_{CCH} | Supply Current | DM74ALS257 | $V_{CC} = 5.5V$, Outputs OPEN | | 3 | 6 | mA |
| | | DM74ALS258 | | | 2.5 | 4 | |
| I_{CCL} | Supply Current | DM74ALS257 | | | 8 | 12 | mA |
| | | DM74ALS258 | | | 7 | 11 | |
| I_{CCZ} | Supply Current | DM74ALS257 | | | 9 | 14 | mA |
| | | DM74ALS258 | | | 8 | 13 | |

Switching Characteristics DM74ALS257

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 $5.5V$, $C_L = 50pF$, $R_L = 500\Omega$ | Data | Any Y | 2 | 10 | ns |
| t_{PHL} | Propagation Delay Time, HIGH-to-LOW Level Output | | Data | Any Y | 2 | 12 | ns |
| t_{PLH} | Propagation Delay Time, LOW-to-HIGH Level Output | | Select | Any Y | 4 | 18 | ns |
| t_{PHL} | Propagation Delay Time, HIGH-to-LOW Level Output | | Select | Any Y | 5 | 22 | ns |
| t_{ZH} | Output Enable Time to HIGH Level | | Output Control | Any Y | 4 | 16 | ns |
| t_{ZL} | Output Enable Time to LOW Level | | Output Control | Any Y | 5 | 18 | ns |
| t_{HZ} | Output Disable Time from HIGH Level | | Output Control | Any Y | 2 | 10 | ns |
| t_{LZ} | Output Disable Time from LOW Level | | Output Control | Any Y | 3 | 15 | ns |

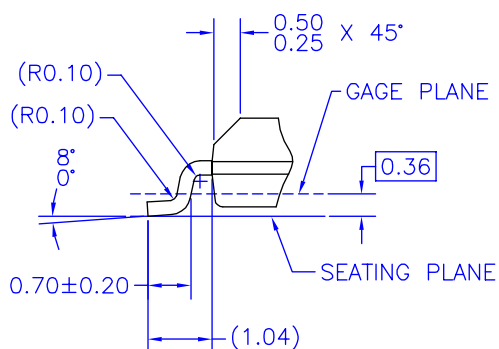
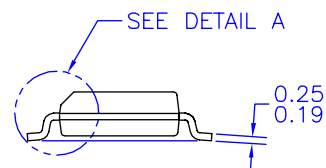
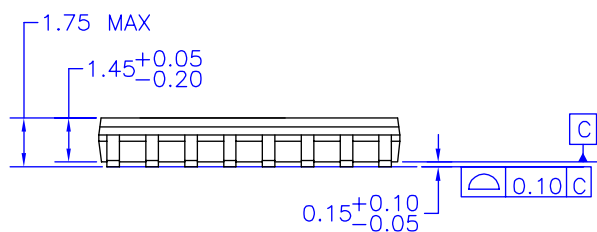
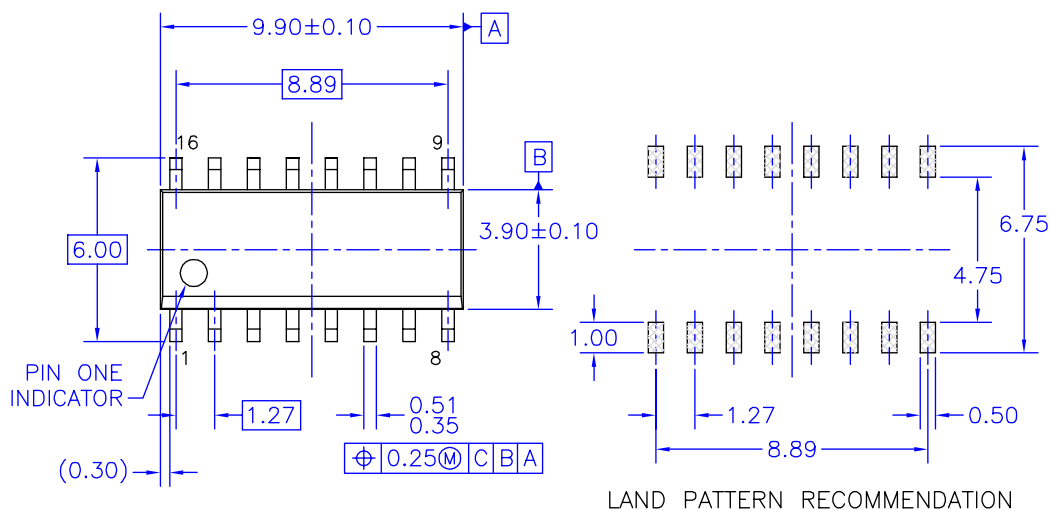
Switching Characteristics DM74ALS258

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 $5.5V$, $C_L = 50pF$, $R_L = 500\Omega$ | Data | Any Y | 2 | 8 | ns |
| t_{PHL} | Propagation Delay Time, HIGH-to-LOW Level Output | | Data | Any Y | 2 | 7 | ns |
| t_{PLH} | Propagation Delay Time, LOW-to-HIGH Level Output | | Select | Any Y | 3 | 20 | ns |
| t_{PHL} | Propagation Delay Time, HIGH-to-LOW Level Output | | Select | Any Y | 5 | 25 | ns |
| t_{ZH} | Output Enable Time to HIGH Level | | Output Control | Any Y | 5 | 18 | ns |
| t_{ZL} | Output Enable Time to LOW Level | | Output Control | Any Y | 5 | 18 | ns |
| t_{HZ} | Output Disable Time from HIGH Level | | Output Control | Any Y | 2 | 10 | ns |
| t_{LZ} | Output Disable Time from LOW Level | | Output Control | Any Y | 3 | 18 | ns |

Physical Dimensions

Dimensions are in millimeters unless otherwise noted.



DETAIL A
SCALE: 2:1

NOTES: UNLESS OTHERWISE SPECIFIED

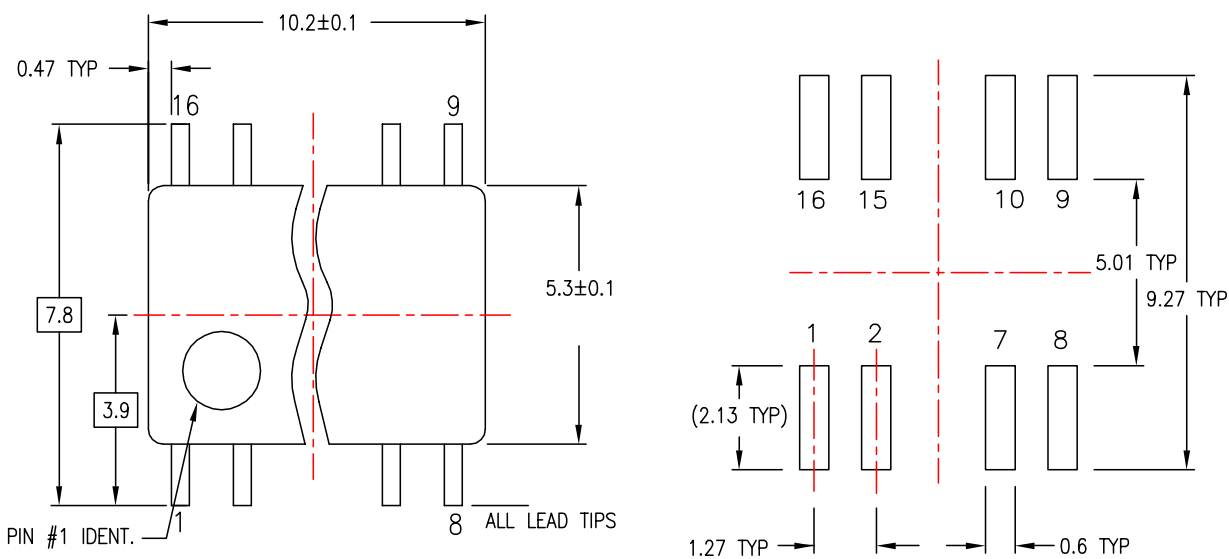
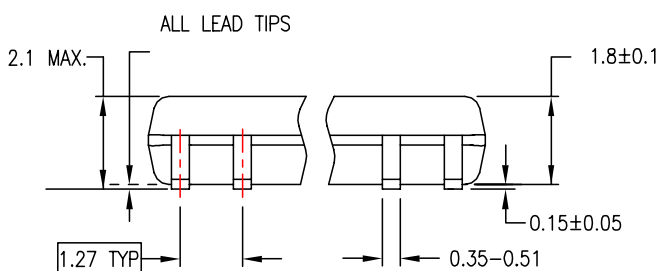
- A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AC, ISSUE C, DATED MAY 1990.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
- D) STANDARD LEAD FINISH:
200 MICROINCHES / 5.08 MICRONS MIN.
LEAD/TIN (SOLDER) ON COPPER.

M1 6AREVK

Figure 1. 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Package Number M16A

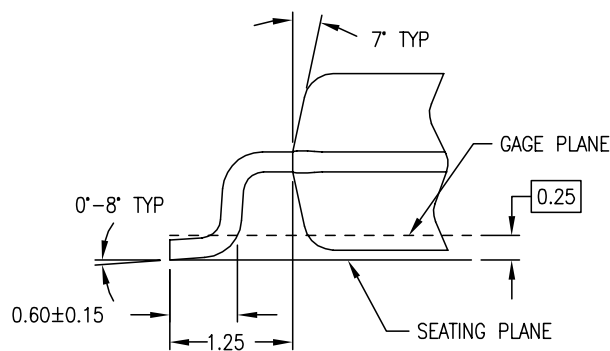
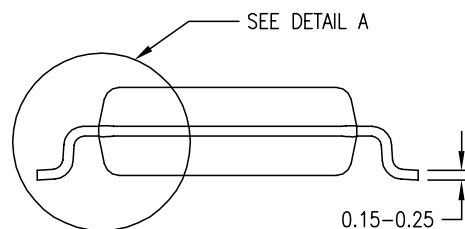
Physical Dimensions (Continued)

Dimensions are in millimeters unless otherwise noted.

LAND PATTERN RECOMMENDATIONDIMENSIONS ARE IN MILLIMETERS

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.


DETAIL A

M16DREVC

**Figure 2. 16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M16D**

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