

## DM74AS257 • DM74AS258

### 3-STATE Quad 1 of 2 Line Data Selector/Multiplexers

#### 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 DM74AS257 presents true data whereas the DM74AS258 presents inverted data to minimize propagation delay time.

This 3-STATE output feature means that n-bit (paralleled) data selectors with up to 300 sources can be implemented for data buses. It also permits the use of standard TTL registers for data retention throughout the system.

#### Features

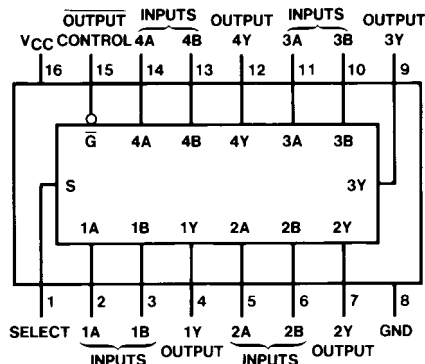
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and  $V_{CC}$  range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky, low power Schottky, and advanced low power Schottky TTL counterpart
- Improved AC performance over Schottky, low power Schottky, and advanced low power Schottky counterparts
- 3-STATE buffer-type output 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

#### Ordering Code:

| Order Number | Package Number | Package Description                                                         |
|--------------|----------------|-----------------------------------------------------------------------------|
| DM74AS257M   | M16A           | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74AS257N   | N16E           | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide       |
| DM74AS258M   | M16A           | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74AS258N   | 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

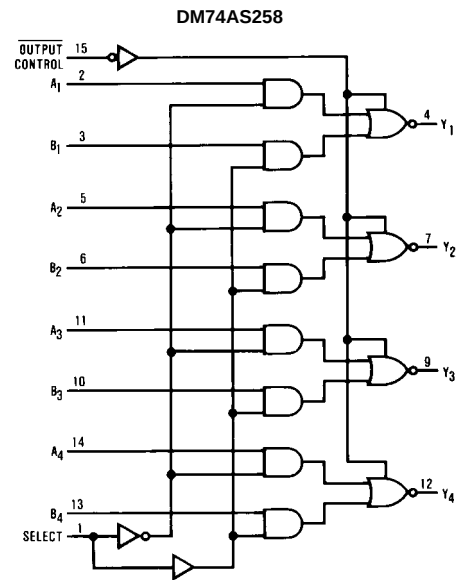
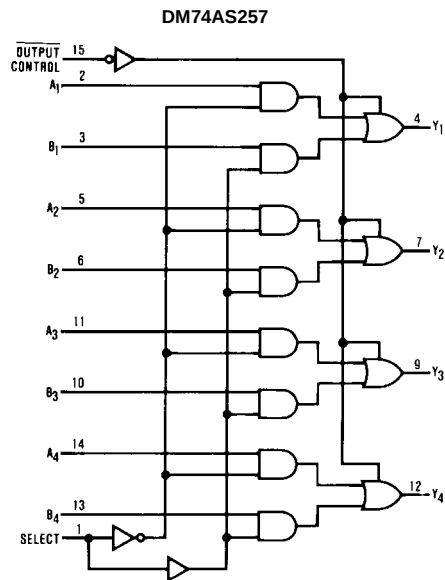


#### Function Table

| INPUTS         |        |   |   | OUTPUT Y |       |
|----------------|--------|---|---|----------|-------|
| OUTPUT CONTROL | SELECT | A | B | AS257    | AS258 |
| 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**(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                            | 75.0°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      |     |     | -15 | mA    |
| $I_{OL}$ | LOW Level Output Current       |     |     | 48  | 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                                  | $V_{CC} = 4.5V$ , $I_I = -18\text{ mA}$             |                      |      | -1.2 | V       |
| $V_{OH}$       | HIGH Level Output Voltage                            | $V_{CC} = 4.5V$ , $I_{OH} = \text{Max}$             | 2.4                  | 3.2  |      | V       |
|                |                                                      | $I_{OH} = -2\text{ mA}$ , $V_{CC} = 4.5V$ to $5.5V$ | $V_{CC} - 2$         |      |      | V       |
| $V_{OL}$       | LOW Level Output Voltage                             | $V_{CC} = 4.5V$ , $I_{OL} = \text{Max}$             |                      | 0.35 | 0.5  | V       |
| $I_I$          | Input Current @ Max Input Voltage                    | $V_{CC} = 5.5V$ , $V_{IH} = 7V$                     | A, B, $\overline{G}$ |      | 0.1  | mA      |
|                |                                                      |                                                     | Select               |      | 0.2  |         |
| $I_{IH}$       | HIGH Level Input Current                             | $V_{CC} = 5.5V$ , $V_{IH} = 2.7V$                   | A, B, $\overline{G}$ |      | 20   | $\mu A$ |
|                |                                                      |                                                     | Select               |      | 40   |         |
| $I_{IL}$       | LOW Level Input Current                              | $V_{CC} = 5.5V$ , $V_{IL} = 0.4V$                   | Select               |      | -1   | mA      |
|                |                                                      |                                                     | All Others           |      | -0.5 |         |
| $I_O$ (Note 2) | Output Drive Current                                 | $V_{CC} = 5.5V$ , $V_O = 2.25V$                     | -30                  |      | -112 | mA      |
| $I_{OZH}$      | Off-State Output Current, HIGH Level Voltage Applied | $V_{CC} = 5.5V$ , $V_O = 2.7V$                      |                      |      | -50  | $\mu A$ |
| $I_{OZL}$      | Off-State Output Current, LOW Level Voltage Applied  | $V_{CC} = 5.5V$ , $V_O = 0.4V$                      |                      |      | -50  | $\mu A$ |
| $I_{CCH}$      | Supply Current                                       | DM74AS257                                           | Outputs HIGH         |      | 12.9 | mA      |
|                |                                                      | DM74AS258                                           |                      |      | 8.8  | mA      |
| $I_{CCL}$      | Supply Current                                       | DM74AS257                                           | Outputs LOW          |      | 19   | mA      |
|                |                                                      | DM74AS258                                           |                      |      | 15.8 | mA      |
| $I_{CCZ}$      | Supply Current                                       | DM74AS257                                           | Outputs Disabled     |      | 19.7 | mA      |
|                |                                                      | DM74AS258                                           |                      |      | 15.5 | mA      |

**Note 2:** The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .

**DM74AS257 Switching Characteristics**

over recommended operating free air temperature range

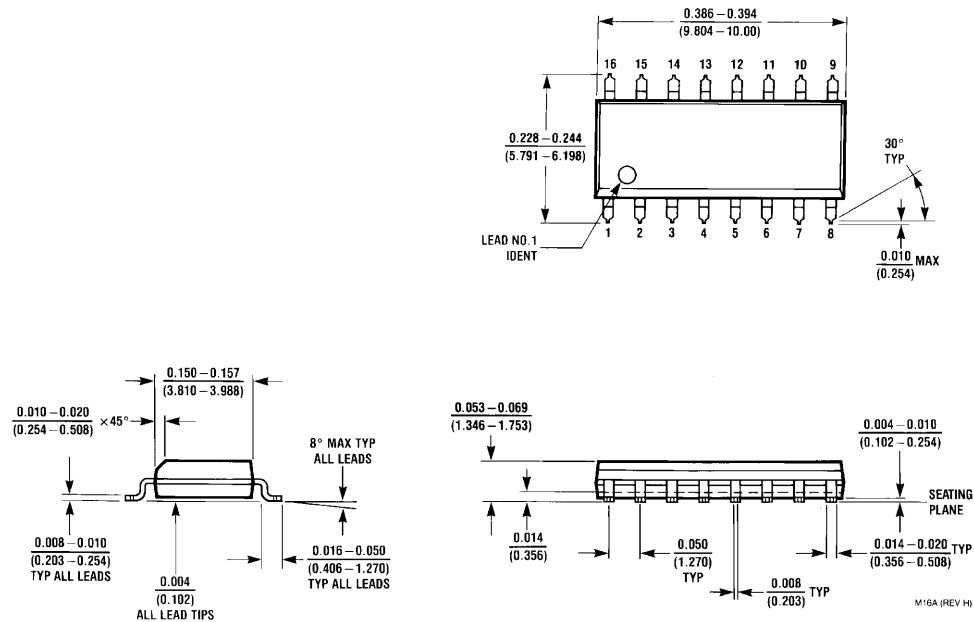
| Symbol           | Parameter                                           | From              | To       | Conditions                                                                          | Min | Max | Units |
|------------------|-----------------------------------------------------|-------------------|----------|-------------------------------------------------------------------------------------|-----|-----|-------|
| t <sub>PLH</sub> | Propagation Delay Time,<br>LOW-to-HIGH Level Output | Data              | Any<br>Y | V <sub>CC</sub> = 4.5V to 5.5V,<br>C <sub>L</sub> = 50 pF,<br>R <sub>L</sub> = 500Ω | 1   | 5.5 | ns    |
| t <sub>PHL</sub> | Propagation Delay Time,<br>HIGH-to-LOW Level Output |                   |          |                                                                                     | 1   | 6   | ns    |
| t <sub>PLH</sub> | Propagation Delay Time,<br>LOW-to-HIGH Level Output | Select            | Any<br>Y |                                                                                     | 2   | 11  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time,<br>HIGH-to-LOW Level Output |                   |          |                                                                                     | 2   | 10  | ns    |
| t <sub>PZH</sub> | Output Enable Time to<br>HIGH Level                 | OUTPUT<br>Control | Any<br>Y |                                                                                     | 2   | 7.5 | ns    |
| t <sub>PZL</sub> | Output Enable Time to<br>LOW Level                  |                   |          |                                                                                     | 2   | 9.5 | ns    |
| t <sub>PHZ</sub> | Output Disable Time,<br>from HIGH Level             | OUTPUT<br>Control | Any<br>Y |                                                                                     | 1.5 | 6.5 | ns    |
| t <sub>PLZ</sub> | Output Disable Time,<br>from LOW Level              |                   |          |                                                                                     | 2   | 7   | ns    |

**DM74AS258 Switching Characteristics**

over recommended operating free air temperature range

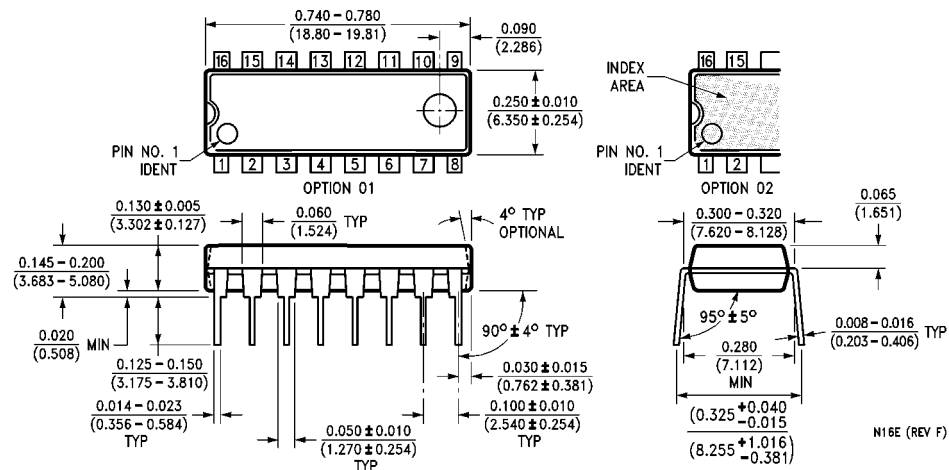
| Symbol           | Parameter                                           | From              | To       | Conditions                                                                          | Min | Max | Units |
|------------------|-----------------------------------------------------|-------------------|----------|-------------------------------------------------------------------------------------|-----|-----|-------|
| t <sub>PLH</sub> | Propagation Delay Time,<br>LOW-to-HIGH Level Output | Data              | Any<br>Y | V <sub>CC</sub> = 4.5V to 5.5V,<br>C <sub>L</sub> = 50 pF,<br>R <sub>L</sub> = 500Ω | 1   | 5   | ns    |
| t <sub>PHL</sub> | Propagation Delay Time,<br>HIGH-to-LOW Level Output |                   |          |                                                                                     | 1   | 4   | ns    |
| t <sub>PLH</sub> | Propagation Delay Time,<br>LOW-to-HIGH Level Output | Select            | Any<br>Y |                                                                                     | 2   | 9.5 | ns    |
| t <sub>PHL</sub> | Propagation Delay Time,<br>HIGH-to-LOW Level Output |                   |          |                                                                                     | 2   | 10  | ns    |
| t <sub>PZH</sub> | Output Enable Time to<br>HIGH Level                 | OUTPUT<br>Control | Any<br>Y |                                                                                     | 2   | 8   | ns    |
| t <sub>PZL</sub> | Output Enable Time to<br>LOW Level                  |                   |          |                                                                                     | 2   | 10  | ns    |
| t <sub>PHZ</sub> | Output Disable Time,<br>from HIGH Level             | OUTPUT<br>Control | Any<br>Y |                                                                                     | 1.5 | 6   | ns    |
| t <sub>PLZ</sub> | Output Disable Time,<br>from LOW Level              |                   |          |                                                                                     | 2   | 6.5 | 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)



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

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DM74AS257

3-STATE Quad 1 of 2 Line Data  
Selectors/Multiplexers

Contents

[General description](#) | [Features](#) | [Product  
status/pricing/package](#)

General description

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[back to top](#)

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- 3-STATE buffer-type output 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

[back to top](#)

Product status/pricing/packaging

| Product      | Product status  | Pricing* | Package type         | Leads | Package marking             | Packing method |
|--------------|-----------------|----------|----------------------|-------|-----------------------------|----------------|
| DM74AS257M   | Full Production | \$0.79   | <a href="#">SOIC</a> | 16    | \$Y&Z&2&T<br>DM74AS<br>257M | RAIL           |
| DM74AS257N   | Full Production | \$0.79   | <a href="#">DIP</a>  | 16    | \$Y&Z&4&T&P<br>DM74AS257N   | RAIL           |
| DM74AS257SJ  | Full Production | \$0.99   | <a href="#">SOP</a>  | 16    | \$Y&Z&2&T<br>AS257SJ        | RAIL           |
| DM74AS257MX  | Full Production | \$0.79   | <a href="#">SOIC</a> | 16    | \$Y&Z&2&T<br>DM74AS<br>257M | TAPE REEL      |
| DM74AS257SJX | Full Production | \$0.99   | <a href="#">SOP</a>  | 16    | \$Y&Z&2&T<br>AS257SJ        | TAPE REEL      |

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