

## DM74AS157 • DM74AS158

### Quad 1 of 2 Line Data Selector/Multiplexer

#### General Description

These data selectors/multiplexers contain inverters and drivers to supply full on-chip data selection to the four output gates. A separate STROBE input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The AS157 presents true data whereas the AS158 presents inverted data to minimize propagation delay time.

#### Features

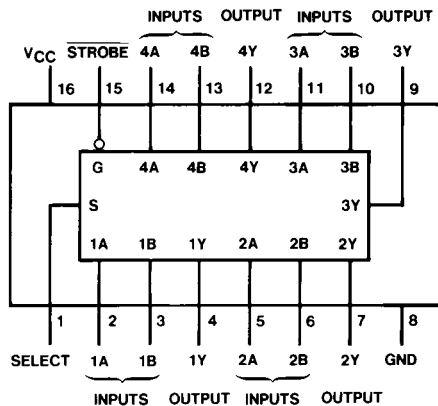
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V<sub>CC</sub> range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky, low power Schottky, and advanced low power Schottky TTL counterpart
- Improved AC performance over Schottky, low power Schottky, and advanced low power Schottky counterparts
- 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   |
|--------------|----------------|---|
| DM74AS157M   | M16A           | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74AS157SJX | M16D           | 16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide               |
| DM74AS157N   | N16E           | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide       |
| DM74AS158M   | M16A           | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74AS158N   | 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

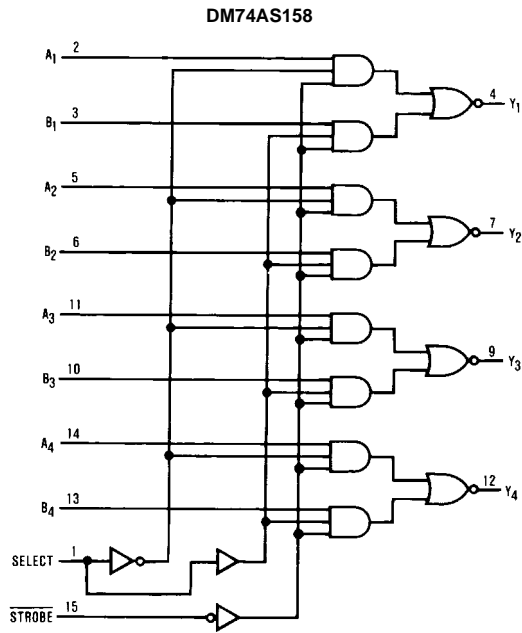
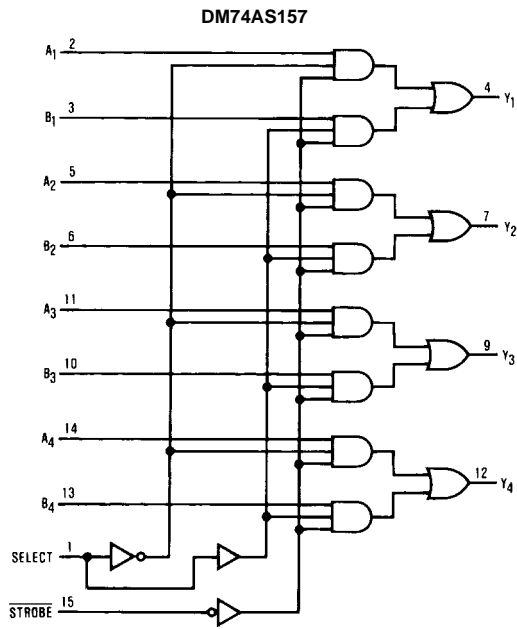


#### Function Table

| STROBE | Inputs |   |   | Output Y  |           |
|--------|--------|---|---|-----------|-----------|
|        | Select | A | B | DM74AS157 | DM74AS158 |
| H      | X      | X | X | L         | H         |
| 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

Logic Diagrams



**Absolute Maximum Ratings**(Note 1)

|                                      |                 |
|--------------------------------------|-----------------|
| Supply Voltage                       | 7V              |
| Input Voltage                        | 7V              |
| 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      |     |     | -2  | 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 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                | $V_{CC} = 4.5V$ , $I_I = -18$ mA              |                      |      | -1.2       | V       |
| $V_{OH}$       | HIGH Level Output Voltage          | $V_{CC} = 4.5V$ to $5.5V$<br>$I_{OH} = -2$ mA | $V_{CC} - 2$         |      |            | V       |
| $V_{OL}$       | LOW Level Output Voltage           | $V_{CC} = 4.5V$<br>$I_{OL} = 20$ mA           |                      | 0.35 | 0.5        | V       |
| $I_I$          | Input Current at Max Input Voltage | $V_{CC} = 5.5V$<br>$V_{IH} = 7V$              | Select<br>All Others |      | 0.2<br>0.1 | mA      |
| $I_{IH}$       | HIGH Level Input Current           | $V_{CC} = 5.5V$<br>$V_{IH} = 2.7V$            | Select<br>All Others |      | 40<br>20   | $\mu A$ |
| $I_{IL}$       | LOW Level Input Current            | $V_{CC} = 5.5V$<br>$V_{IL} = 0.4V$            | Select<br>All Others |      | -1<br>-0.5 | mA      |
| $I_O$ (Note 2) | Output Drive Current               | $V_{CC} = 5.5V$ , $V_O = 2.25V$               | -30                  |      | -112       | mA      |
| $I_{CC}$       | Supply Current                     | $V_{CC} = 5.5V$                               |                      |      |            |         |
|                |                                    | DM74AS157                                     |                      | 17.5 | 28         | mA      |
|                |                                    | DM74AS158                                     |                      | 15.6 | 22.5       | mA      |

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

**DM74AS157 Switching Characteristics**

over recommended operating free air temperature range

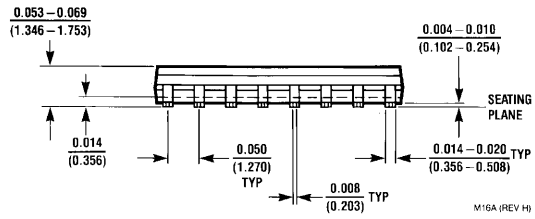
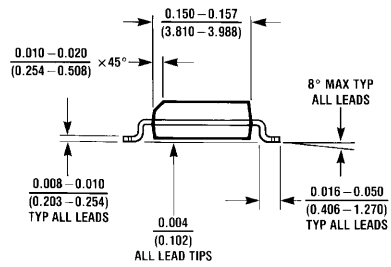
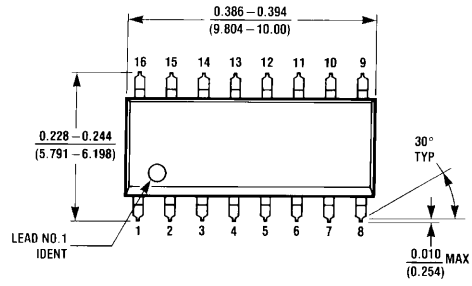
| Symbol    | Parameter  | Conditions   | From (Input)               | To (Output) | Min | Max  | Units |
|-----------|--|--|----------------------------|-------------|-----|------|-------|
| $t_{PLH}$ | Propagation Delay Time, LOW-to-HIGH Level Output | $V_{CC} = 4.5V$ to $5.5V$ ,<br>$C_L = 50$ pF,<br>$R_L = 500\Omega$ | Data                       | Y           | 1   | 6    | ns    |
| $t_{PHL}$ | Propagation Delay Time, HIGH-to-LOW Level Output |  | Data                       | Y           | 1   | 5.5  | ns    |
| $t_{PLH}$ | Propagation Delay Time, LOW-to-HIGH Level Output |  | $\overline{\text{STROBE}}$ | Y           | 2   | 10.5 | ns    |
| $t_{PHL}$ | Propagation Delay Time, HIGH-to-LOW Level Output |  | $\overline{\text{STROBE}}$ | Y           | 2   | 7.5  | ns    |
| $t_{PLH}$ | Propagation Delay Time, LOW-to-HIGH Level Output |  | Select                     | Y           | 2   | 11   | ns    |
| $t_{PHL}$ | Propagation Delay Time, HIGH-to-LOW Level Output |  | Select                     | Y           | 2   | 10   | ns    |

**DM74AS158 Switching Characteristics**

over recommended operating free air temperature range

| Symbol    | Parameter  | Conditions   | From (Input)               | To (Output) | 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>$R_L = 500\Omega$ | Data                       | Y           | 1   | 5    | ns    |
| $t_{PHL}$ | Propagation Delay Time, HIGH-to-LOW Level Output |  | Data                       | Y           | 1   | 4.5  | ns    |
| $t_{PLH}$ | Propagation Delay Time, LOW-to-HIGH Level Output |  | $\overline{\text{STROBE}}$ | Y           | 2   | 6.5  | ns    |
| $t_{PHL}$ | Propagation Delay Time, HIGH-to-LOW Level Output |  | $\overline{\text{STROBE}}$ | Y           | 2   | 10   | ns    |
| $t_{PLH}$ | Propagation Delay Time, LOW-to-HIGH Level Output |  | Select                     | Y           | 2   | 9.5  | ns    |
| $t_{PHL}$ | Propagation Delay Time, HIGH-to-LOW Level Output |  | Select                     | Y           | 2   | 10.5 | ns    |

**Physical Dimensions** inches (millimeters) unless otherwise noted

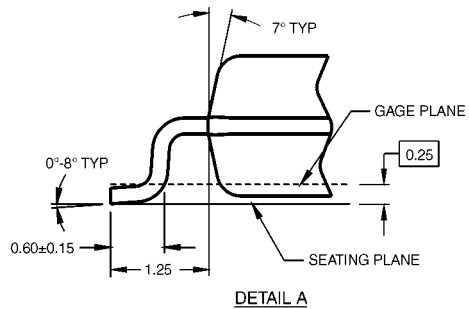
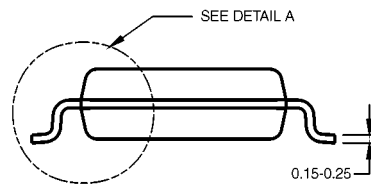


**16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow  
Package Number M16A**

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M16A (REV H)

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



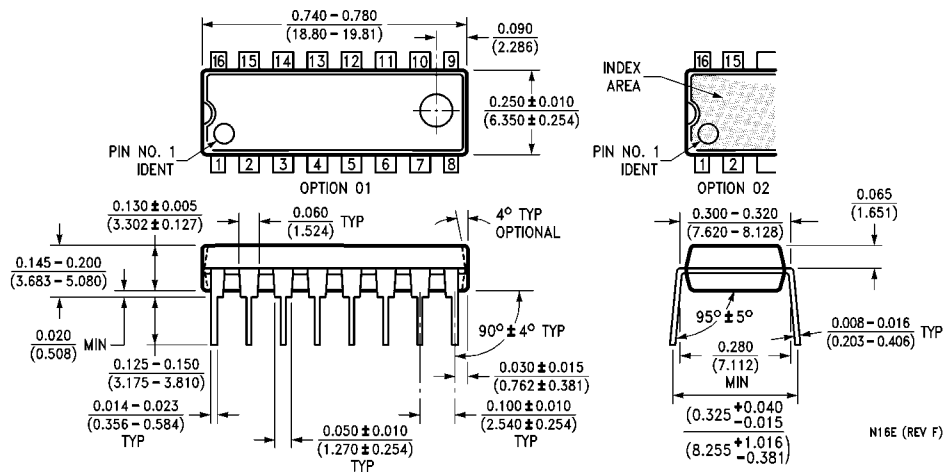
DIMENSIONS ARE IN MILLIMETERS

- 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.

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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