

DM74LS257B 3-STATE Quad 2-Data Selectors/Multiplexers

General Description

These Schottky-clamped high-performance multiplexers feature 3-STATE outputs that can interface directly with data lines of bus-organized systems. With all but one of the common outputs disabled (at a high impedance state), the low impedance of the single enabled output will drive the bus line to a HIGH or LOW logic level. To minimize the possibility that two outputs will attempt to take a common bus to opposite logic levels, the output enable circuitry is designed such that the output disable times are shorter than the output enable times.

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.

Features

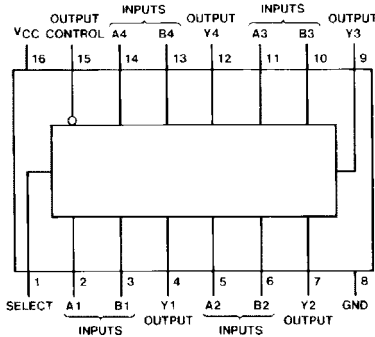
- 3-STATE versions LS157 and LS158 with same pinouts
- Schottky-clamped for significant improvement in A-C performance
- Provides bus interface from multiple sources in high-performance systems
- Average propagation delay from data input 12 ns
- Typical power dissipation: 50 mW

Ordering Code:

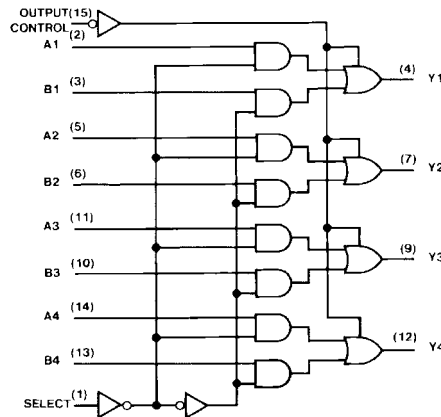
| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74LS257BM | M16A | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74LS257BN | N16E | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

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

Connection Diagram



Logic Diagram



Function Table

| Inputs | | | | Output Y |
|----------------|--------|---|---|----------|
| Output Control | Select | A | B | LS257 |
| H | X | X | X | Z |
| L | L | L | X | L |
| L | L | H | X | H |
| L | H | X | L | L |
| L | H | X | H | H |

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

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 |

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 | | | -2.6 | mA |
| I _{OL} | LOW Level Output Current | | | 24 | mA |
| T _A | Free Air Operating Temperature | 0 | | 70 | °C |

DC Electrical Characteristics

| Symbol | Parameter | Conditions | Min | Typ (Note 2) | Max | Units |
|------------------|---|--|--------|-----------------|------|-------|
| V _I | Input Clamp Voltage | V _{CC} = Max, I _I = -18 mA | | | -1.5 | V |
| V _{OH} | HIGH Level Output Voltage | V _{IL} = Max, V _{IH} = Min | 2.4 | 3.1 | | V |
| V _{OL} | LOW Level Output Voltage | V _{IL} = Max, V _{IH} = Min | | 0.35 | 0.5 | V |
| | | I _{OL} = 12 mA, V _{CC} = Min | | 0.25 | 0.4 | |
| I _I | Input Current @ Max Input Voltage | V _{CC} = Max, V _I = 7V | Select | | 0.2 | mA |
| | | | Other | | 0.1 | |
| I _{IH} | HIGH Level Input Current | V _{CC} = Max, V _I = 2.7V | Select | | 40 | μA |
| | | | Other | | 20 | |
| I _{IL} | LOW Level Input Current | V _{CC} = Max, V _I = 0.4V | Select | | -0.8 | mA |
| | | | Other | | -0.4 | |
| I _{OZH} | OFF-State Output Current with HIGH Level Output Voltage Applied | V _{CC} = Max, V _O = 2.7V V _{IH} = Min, V _{IL} = Max | | | 20 | μA |
| I _{OZL} | OFF-State Output Current with LOW Level Output Voltage Applied | V _{CC} = Max, V _O = 0.4V V _{IH} = Min, V _{IL} = Max | | | -20 | μA |
| I _{OS} | Short Circuit Output Current | V _{CC} = Max (Note 3) | -20 | | -100 | mA |
| I _{CCH} | Supply Current with Outputs HIGH | V _{CC} = Max (Note 4) | | 5.9 | 10 | mA |
| I _{CCL} | Supply Current with Outputs LOW | V _{CC} = Max (Note 4) | | 9.2 | 16 | mA |
| I _{CCZ} | Supply Current with Outputs Disabled | V _{CC} = Max (Note 4) | | 12 | 19 | 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 all outputs open and all possible inputs grounded, while achieving the stated output conditions.

Switching Characteristics

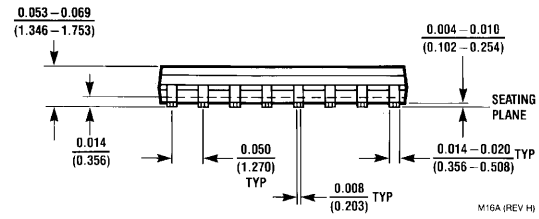
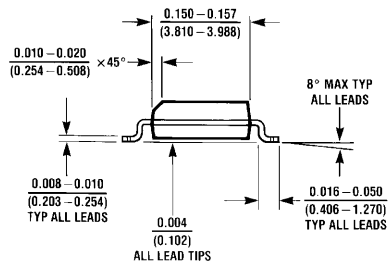
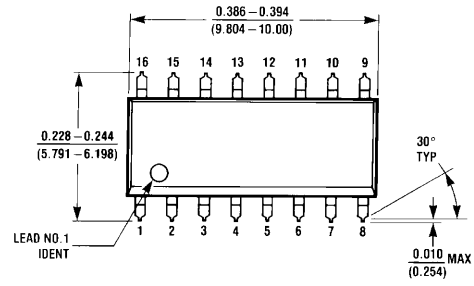
$V_{CC} = 5V$ and $T_A = 25^\circ C$

| Symbol | Parameter | From (Input) To (Output) | RL = 667 Ω | | | | Units |
|------------------|--|-----------------------------|------------------------|-----|-------------------------|-----|-------|
| | | | C _L = 45 pF | | C _L = 150 pF | | |
| | | | Min | Max | Min | Max | |
| t _{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | Data to Output | | 18 | | 27 | ns |
| t _{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | Data to Output | | 18 | | 27 | ns |
| t _{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | Select to Output | | 28 | | 35 | ns |
| t _{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | Select to Output | | 35 | | 42 | ns |
| t _{PZH} | Output Enable Time to HIGH Level Output | Output Control to Y | | 15 | | 27 | ns |
| t _{PZL} | Output Enable Time to LOW Level Output | Output Control to Y | | 28 | | 38 | ns |
| t _{PHZ} | Output Disable Time from HIGH Level Output (Note 5) | Output Control to Y | | 28 | | | ns |
| t _{PLZ} | Output Disable Time from LOW Level Output (Note 5) | Output Control to Y | | 25 | | | ns |

Note 5: C_L = 5 pF

DM74LS257B

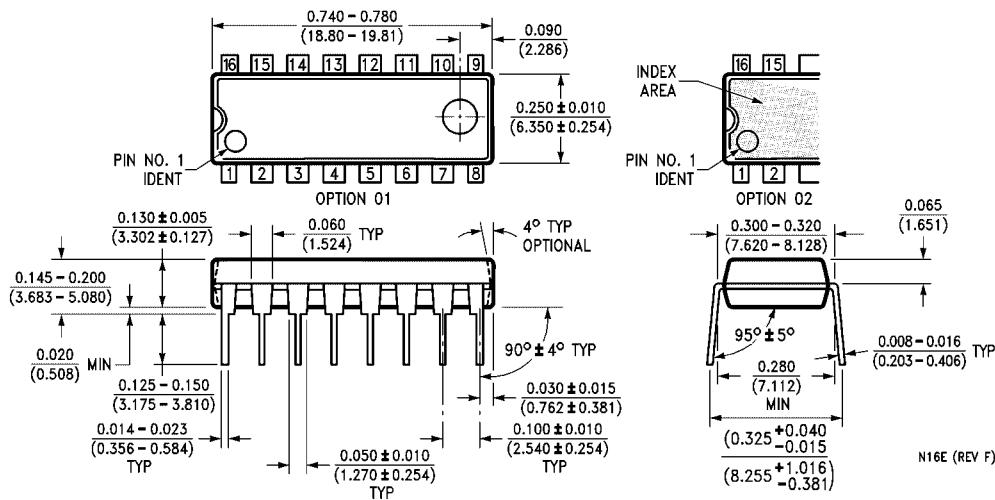
Physical Dimensions inches (millimeters) unless otherwise noted



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

M16A (REV H)

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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