

DM74LS253

3-STATE Data Selector/Multiplexer

General Description

Each of these Schottky-clamped data selectors/multiplexers contains inverters and drivers to supply fully complementary, on-chip, binary decoding data selection to the AND-OR gates. Separate output control inputs are provided for each of the two four-line sections.

The 3-STATE outputs 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.

Features

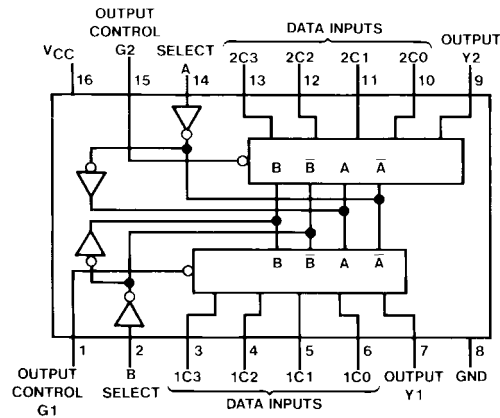
- 3-STATE version of DM74LS153 with same pinout
- Schottky-diode-clamped transistors
- Permit multiplexing from N-lines to one line
- Performs parallel-to-serial conversion
- Strobe/output control
- High fanout totem-pole outputs
- Typical propagation delay
 - Data to output 12 ns
 - Select to output 21 ns
- Typical power dissipation 35 mW

Ordering Code:

| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74LS253M | M16A | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74LS253N | 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



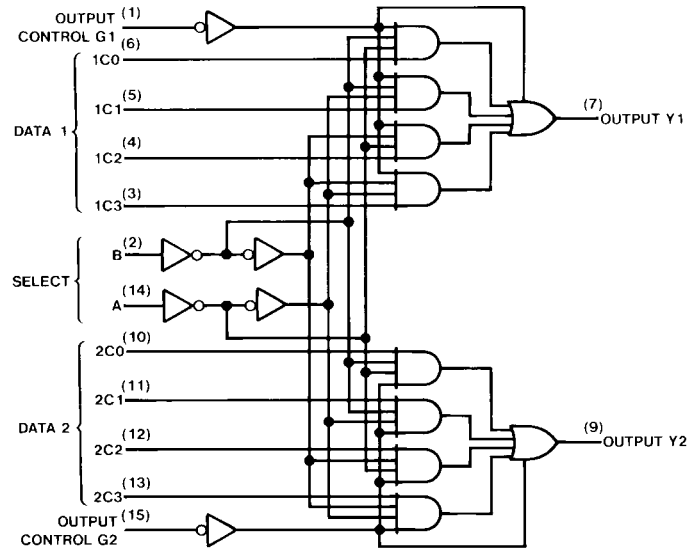
Function Table

| Select Inputs | | Data Inputs | | | | Output Control | Output |
|---------------|---|-------------|----|----|----|----------------|--------|
| B | A | C0 | C1 | C2 | C3 | G | Y |
| X | X | X | X | X | X | H | Z |
| L | L | L | X | X | X | L | L |
| L | L | H | X | X | X | L | H |
| L | H | X | L | X | X | L | L |
| L | H | X | H | X | X | L | H |
| H | L | X | X | L | X | L | L |
| H | L | X | X | H | X | L | H |
| H | H | X | X | X | L | L | L |
| H | H | X | X | X | H | L | H |

Address Inputs A and B are common to both sections.

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

Logic Diagram



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" table 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 |

Electrical Characteristics

over recommended operating free air temperature range (unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ (Note 2) | Max | Units |
|------------------|---|--|-----|-----------------|------|-------|
| V _I | Input Clamp Voltage | V _{CC} = Min, I _I = -18 mA | | | -1.5 | V |
| V _{OH} | HIGH Level Output Voltage | V _{CC} = Min, I _{OH} = Max V _{IL} = Max, V _{IH} = Min | 2.4 | 3.1 | | V |
| V _{OL} | LOW Level Output Voltage | V _{CC} = Min, I _{OL} = Max V _{IL} = Max, V _{IH} = Min | | | 0.5 | V |
| | | I _{OL} = 12 mA, V _{CC} = Min | | | 0.4 | |
| I _I | Input Current @ Max Input Voltage | V _{CC} = Max, V _I = 7V | | | 0.1 | mA |
| I _{IH} | HIGH Level Input Current | V _{CC} = Max, V _I = 2.7V | | | 20 | μA |
| I _{IL} | LOW Level Input Current | V _{CC} = Max, V _I = 0.4V | | | -0.4 | mA |
| 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 |
| | | V _{CC} = Max, V _O = 0.4V V _{IH} = Min, V _{IL} = Max | | | -20 | |
| I _{OZL} | Off-State Output Current with LOW Level Output Voltage Applied | V _{CC} = Max (Note 3) V _{IH} = Min, V _{IL} = Max | -20 | | -100 | mA |
| I _{OS} | Short Circuit Output Current | V _{CC} = Max (Note 4) | | 7 | 12 | mA |
| I _{CC1} | Supply Current | V _{CC} = Max (Note 5) | | 8.5 | 14 | mA |
| I _{CC2} | Supply Current | V _{CC} = Max (Note 5) | | | | 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_{CC1} is measured with all outputs OPEN, and all the inputs grounded.

Note 5: I_{CC2} is measured with the outputs OPEN, OUTPUT CONTROL at 4.5V and all other inputs grounded.

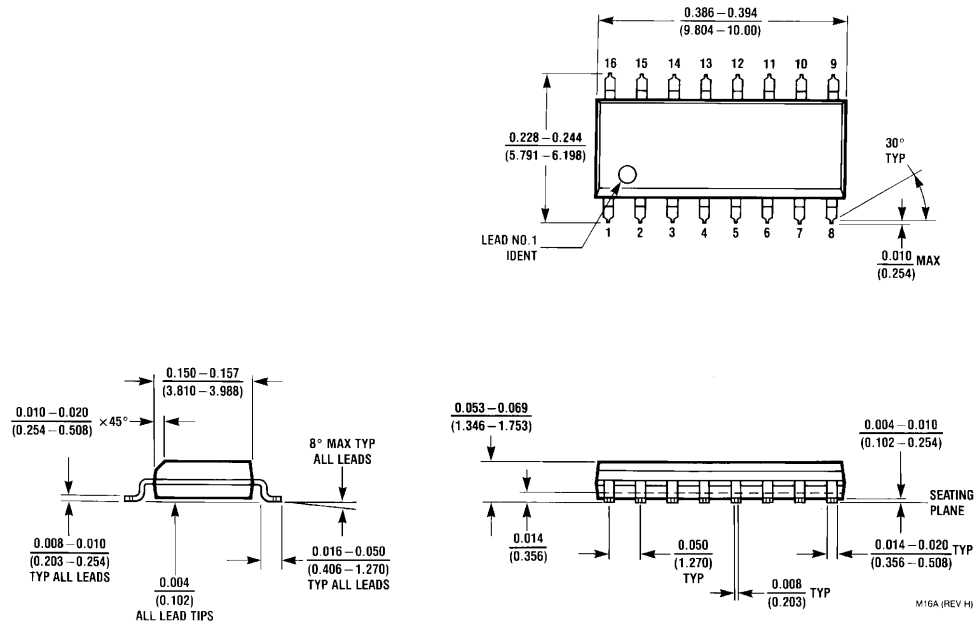
Switching Characteristics

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

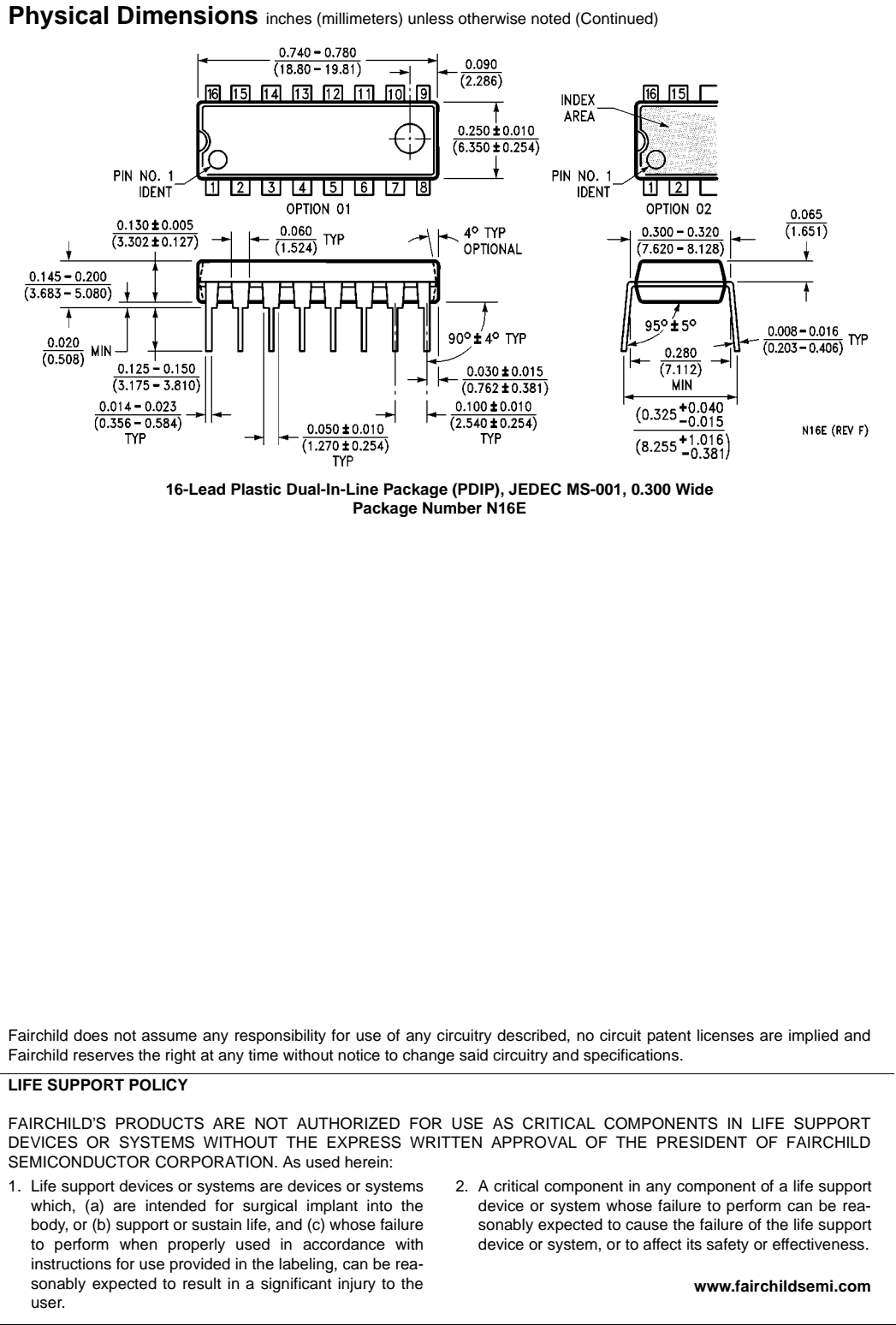
| Symbol | Parameter | From (Input) To (Output) | $R_L = 667\Omega$ | | | | Units |
|-----------|--|-----------------------------|----------------------|-----|-----------------------|-----|-------|
| | | | $C_L = 45\text{ pF}$ | | $C_L = 150\text{ pF}$ | | |
| | | | Min | Max | Min | Max | |
| t_{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | Data to Y | | 25 | | 35 | ns |
| t_{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | Data to Y | | 20 | | 30 | ns |
| t_{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | Select to Y | | 45 | | 54 | ns |
| t_{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | Select to Y | | 32 | | 44 | ns |
| t_{PZH} | Output Enable Time to HIGH Level Output | Output Control to Y | | 18 | | 32 | ns |
| t_{PZL} | Output Enable Time to LOW Level Output | Output Control to Y | | 23 | | 35 | ns |
| t_{PHZ} | Output Disable Time from HIGH Level Output (Note 6) | Output Control to Y | | 41 | | | ns |
| t_{PLZ} | Output Disable Time from LOW Level Output (Note 6) | Output Control to Y | | 27 | | | ns |

Note 6: $C_L = 5\text{ pF}$.

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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