

DM74LS125A Quad 3-STATE Buffer

General Description

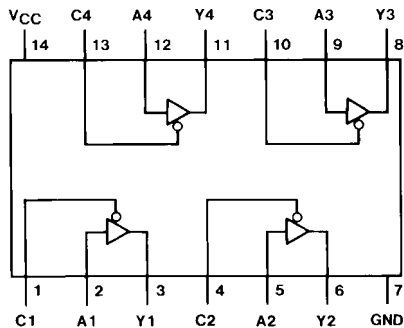
This device contains four independent gates each of which performs a non-inverting buffer function. The outputs have the 3-STATE feature. When enabled, the outputs exhibit the low impedance characteristics of a standard LS output with additional drive capability to permit the driving of bus lines without external resistors. When disabled, both the output transistors are turned off presenting a high-impedance state to the bus line. Thus the output will act neither as a significant load nor as a driver. To minimize the possibility that two outputs will attempt to take a common bus to opposite logic levels, the disable time is shorter than the enable time of the outputs.

Ordering Code:

| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74LS125AM | M14A | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow |
| DM74LS125ASJ | M14D | 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| DM74LS125AN | N14A | 14-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

$$Y = A$$

| Inputs | | Output |
|--------|---|--------|
| A | C | Y |
| L | L | L |
| H | L | H |
| X | H | Hi-Z |

H = HIGH Logic Level
L = LOW Logic Level
X = Either LOW or HIGH Logic Level
Hi-Z = 3-STATE (Outputs are disabled)

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 |

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 | 3.4 | | V |
| V _{OL} | LOW Level Output Voltage | V _{CC} = Min, I _{OL} = Max V _{IL} = Max I _{OL} = 12 mA, V _{CC} = Min | | 0.35 0.25 | 0.5 0.4 | V |
| 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 = 2.4V 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 _{CC} | Supply Current | V _{CC} = Max (Note 4) | | 11 | 20 | 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 the data control (C) inputs at 4.5V and the data inputs grounded.

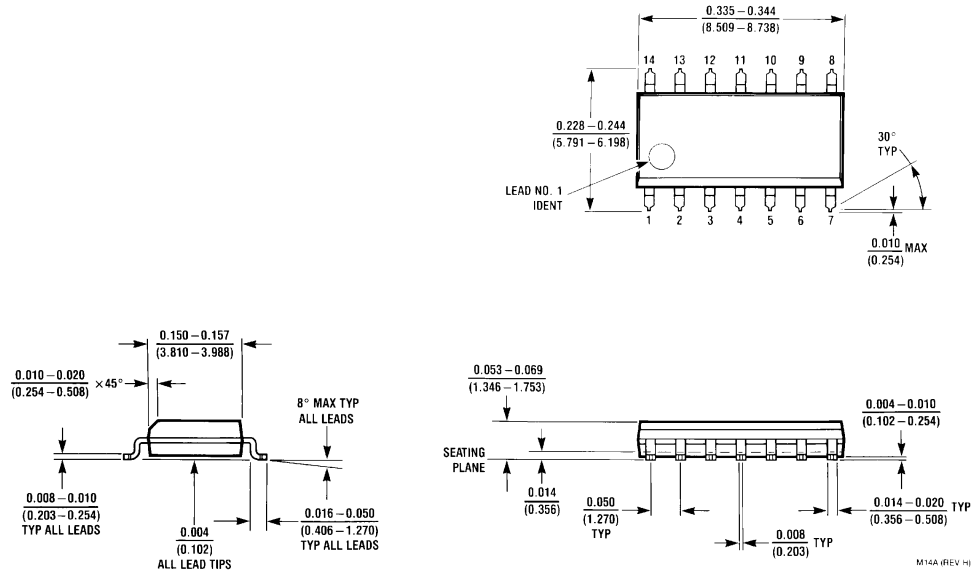
Switching Characteristics

at V_{CC} = 5V and T_A = 25°C

| Symbol | Parameter | R _L = 667Ω | | | | Units |
|------------------|---|------------------------|-----|-------------------------|-----|-------|
| | | C _L = 50 pF | | C _L = 150 pF | | |
| | | Min | Max | Min | Max | |
| t _{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | | 15 | | 21 | ns |
| t _{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | | 18 | | 22 | ns |
| t _{PZH} | Output Enable Time to HIGH Level Output | | 25 | | 35 | ns |
| t _{PZL} | Output Enable Time to LOW Level Output | | 25 | | 40 | ns |
| t _{PHZ} | Output Disable Time from HIGH Level Output (Note 5) | | 20 | | | ns |
| t _{PLZ} | Output Disable Time from LOW Level Output (Note 5) | | 20 | | | ns |

Note 5: C_L = 5pF.

Physical Dimensions inches (millimeters) unless otherwise noted



**14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow
Package Number M14A**

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.

M14DRevB1



**14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
 Package Number M14D**

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