

DM74ALS125 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. The 3-STATE circuitry contains a feature that maintains the buffer outputs in 3-STATE (high impedance state) during power supply ramp-up or ramp-down. This eliminates bus glitching problems that arise during power-up and power-down. 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.

Features

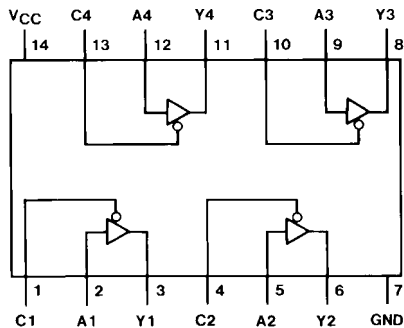
- Advanced low power oxide-isolated ion-implanted Schottky TTL process
- Functional and pin compatible with the 74LS counterpart
- Switching response specified into 500Ω and 50 pF load
- Switching response specifications guaranteed over full temperature and V_{CC} supply range
- PNP input design reduces input loading
- Low level drive current: 74ALS = 24 mA

Ordering Code:

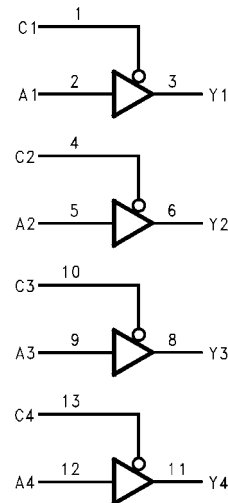
| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74ALS125M | M14A | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow |
| DM74ALS125N | N14A | 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

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

Connection Diagram



Logic Diagram



Functional Table

Y = A

| Input | | 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, V_{CC} | 7V |
| Input Voltage | 7V |
| Voltage Applied to Disabled Output | 5.5V |
| Operating Free Air Temperature Range | 0 to +70°C |
| Storage Temperature Range | -65°C to +150°C |
| Typical θ_{JA} | |
| N Package | 78.0°C/W |
| M Package | 111.0°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 | Typ | 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 | | | 24 | mA |
| T_A | Operating Free-Air Temperature | 0 | | 70 | °C |

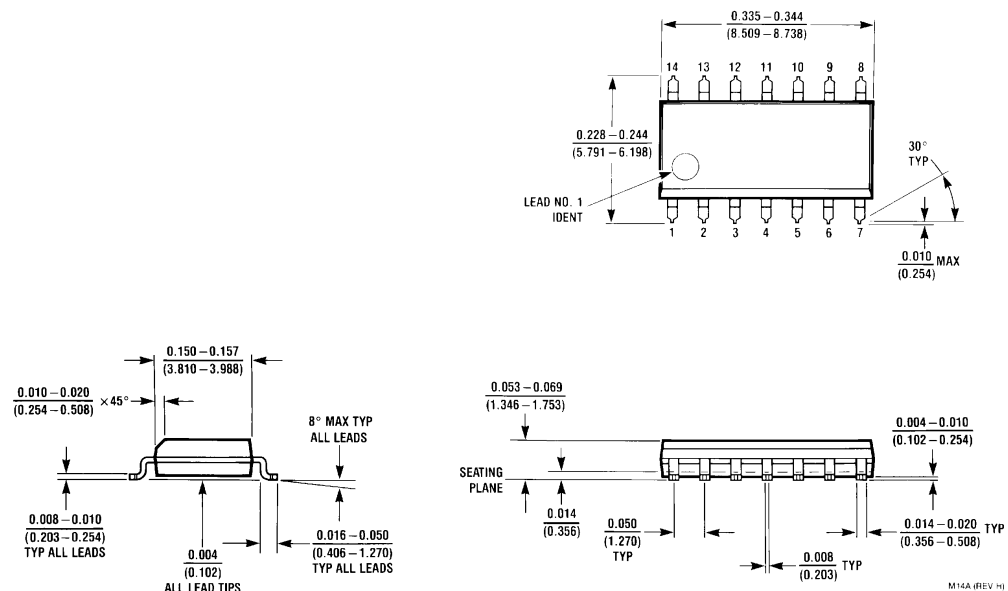
Electrical Characteristics

over recommended operating free air temperature (unless otherwise specified)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------|------------------------------------|--------------------------------------|---------------------------|--------------|------|---------------|
| V_{IK} | Input Clamp Voltage | $V_{CC} = 4.5V, I_I = -18\text{ mA}$ | | | -1.5 | V |
| V_{OH} | HIGH Level Output Voltage | $V_{CC} = 4.5V\text{ to }5.5V$ | $I_{OH} = -0.4\text{ mA}$ | $V_{CC} - 2$ | | V |
| | | $V_{CC} = 4.5V$ | $I_{OH} = -3\text{ mA}$ | 2.4 | | V |
| | | | $I_{OH} = \text{Max}$ | 2 | | V |
| V_{OL} | LOW Level Output Voltage | $V_{CC} = 4.5V$ | $I_{OL} = 12\text{ mA}$ | 0.25 | 0.4 | V |
| | | | $I_{OL} = 24\text{ mA}$ | 0.35 | 0.5 | V |
| I_I | Input Current at Max Input Voltage | $V_{CC} = 5.5V, V_I = 7V$ | | | 0.1 | mA |
| I_{IH} | HIGH Level Input Current | $V_{CC} = 5.5V, V_I = 2.7V$ | | | 20 | μA |
| I_{IL} | LOW Level Input Current | $V_{CC} = 5.5V, V_{IL} = 0.4V$ | | | -0.1 | mA |
| I_O | Output Drive Current | $V_{CC} = 5.5V, V_O = 2.25V$ | -30 | | -112 | mA |
| I_{OZH} | HIGH Level 3-STATE Output Current | $V_{CC} = 5.5V, V_O = 2.7V$ | | | 20 | μA |
| I_{OZL} | LOW Level 3-STATE Output Current | $V_{CC} = 5.5V, V_O = 0.4V$ | | | -20 | μA |
| I_{CC} | Supply Current | $V_{CC} = 5.5V$ | Outputs HIGH | 7 | 10 | mA |
| | | | Outputs LOW | 10 | 14 | mA |
| | | | 3-STATE | 13.5 | 18 | mA |

| Switching Characteristics | | | | | | | |
|---------------------------|--|--------------|-------------|--|-----|-----|-------|
| Symbol | Parameter | From (Input) | To (Output) | Conditions | Min | Max | Units |
| t_{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | A | Y | $V_{CC} = 4.5V$ to $5.5V$, $C_L = 50$ pF, $R1 = 500\Omega$, $R2 = 500\Omega$, $T_A = \text{Min to Max}$ | 3 | 10 | ns |
| t_{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | A | Y | | 2 | 10 | ns |
| t_{PZH} | Output Enable Time to HIGH Level Output | C | Y | | 2 | 13 | ns |
| t_{PZL} | Output Enable Time to LOW Level Output | C | Y | | 2 | 12 | ns |
| t_{PHZ} | Output Disable Time from HIGH Level Output | C | Y | | 1 | 8 | ns |
| t_{PLZ} | Output Disable Time from LOW Level Output | C | Y | | 2 | 13 | ns |
| | | | | | | | |

Physical Dimensions inches (millimeters) unless otherwise noted



**14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
Package Number M14A**

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



14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N14A

N14A (REV F)

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