**FAIRCHILD**

SEMICONDUCTOR ™

# DM74LS14
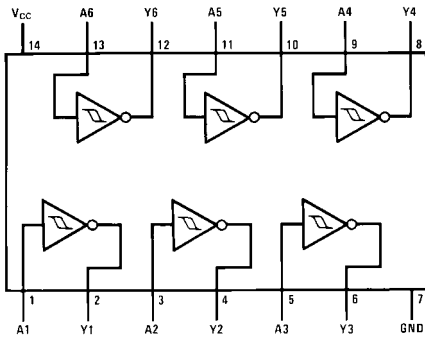# Hex Inverter with Schmitt Trigger Inputs

## General Description

This device contains six independent gates each of which performs the logic INVERT function. Each input has hysteresis which increases the noise immunity and transforms a slowly changing input signal to a fast changing, jitter free output.

## Ordering Code:

| Order Number | Package Number | Package Description |
|---|---|---|
| DM74LS14M | M14A | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow |
| DM74LS14SJ | M14D | 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| DM74LS14N | 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

$$Y = \overline{A}$$

| Input | Output |
|---|---|
| **A** | **Y** |
| L | H |
| H | L |

H = HIGH Logic Level
L = LOW Logic Level

**DM74LS14**

## 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 |
| $V_{T+}$ | Positive-Going Input Threshold Voltage (Note 2) | 1.4 | 1.6 | 1.9 | V |
| $V_{T-}$ | Negative-Going Input Threshold Voltage (Note 2) | 0.5 | 0.8 | 1 | V |
| HYS | Input Hysteresis (Note 2) | 0.4 | 0.8 | | V |
| $I_{OH}$ | HIGH Level Output Current | | | −0.4 | mA |
| $I_{OL}$ | LOW Level Output Current | | | 8 | mA |
| $T_A$ | Free Air Operating Temperature | 0 | | 70 | °C |

**Note 2:** $V_{CC}$ = 5V.

## Electrical Characteristics

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

| Symbol | Parameter | Conditions | Min | Typ (Note 3) | 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 | 2.7 | 3.4 | | V |
| $V_{OL}$ | LOW Level Output Voltage | $V_{CC}$ = Min, $I_{OL}$ = Max $V_{IH}$ = Min | | 0.35 | 0.5 | V |
| | | $V_{CC}$ = Min, $I_{OL}$ = 4 mA | | 0.25 | 0.4 | |
| $I_{T+}$ | Input Current at Positive-Going Threshold | $V_{CC}$ = 5V, $V_I$ = $V_{T+}$ | | −0.14 | | mA |
| $I_{T-}$ | Input Current at Negative-Going Threshold | $V_{CC}$ = 5V, $V_I$ = $V_{T-}$ | | −0.18 | | mA |
| $I_I$ | 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 |
| $I_{OS}$ | Short Circuit Output Current | $V_{CC}$ = Max (Note 4) | −20 | | −100 | mA |
| $I_{CCH}$ | Supply Current with Outputs HIGH | $V_{CC}$ = Max | | 8.6 | 16 | mA |
| $I_{CCL}$ | Supply Current with Outputs LOW | $V_{CC}$ = Max | | 12 | 21 | mA |

**Note 3:** All typicals are at $V_{CC}$ = 5V, $T_A$ = 25°C.

**Note 4:** Not more than one output should be shorted at a time, and the duration should not exceed one second.

## Switching Characteristics

at $V_{CC}$ = 5V and $T_A$ = 25°C

| Symbol | Parameter | $R_L$ = 2 kΩ | | | | Units |
|---|---|---|---|---|---|---|
| | | $C_L$ = 15 pF | | $C_L$ = 50 pF | | |
| | | Min | Max | Min | Max | |
| $t_{PLH}$ | Propagation Delay Time LOW-to-HIGH Level Output | 5 | 22 | 8 | 25 | ns |
| $t_{PHL}$ | Propagation Delay Time HIGH-to-LOW Level Output | 5 | 22 | 10 | 33 | ns |