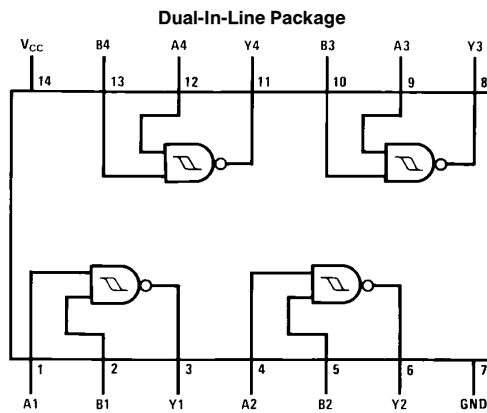


## DM54132/DM74132 Quad 2-Input NAND Gates with Schmitt Trigger Inputs

### General Description

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

### Connection Diagram



TL/F/6542-1

Order Number DM54132J or DM74132N  
See NS Package Number J14A or N14A

### Function Table

$$Y = \overline{AB}$$

| Inputs |   | Output |
|--------|---|--------|
| A      | B | Y      |
| L      | L | H      |
| L      | H | H      |
| H      | L | H      |
| H      | H | L      |

H = High Logic Level

L = Low Logic Level

## Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

|                                      |                 |
|--------------------------------------|-----------------|
| Supply Voltage                       | 7V              |
| Input Voltage                        | 5.5V            |
| Operating Free Air Temperature Range |                 |
| DM54                                 | -55°C to +125°C |
| DM74                                 | 0°C to +70°C    |
| Storage Temperature Range            | -65°C to +150°C |

Note: 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                                       | DM54132 |     |      | DM74132 |     |      | Units |
|-----------------|---|---------|-----|------|---------|-----|------|-------|
|                 |   | Min     | Typ | Max  | Min     | Typ | Max  |       |
| V <sub>CC</sub> | Supply Voltage                                  | 4.5     | 5   | 5.5  | 4.75    | 5   | 5.25 | V     |
| V <sub>T+</sub> | Positive-Going Input Threshold Voltage (Note 1) | 1.5     | 1.7 | 2    | 1.5     | 1.7 | 2    | V     |
| V <sub>T-</sub> | Negative-Going Input Threshold Voltage (Note 1) | 0.6     | 0.9 | 1.1  | 0.6     | 0.9 | 1.1  | V     |
| HYS             | Input Hysteresis (Note 1)                       | 0.4     | 0.8 |      | 0.4     | 0.8 |      | V     |
| I <sub>OH</sub> | High Level Output Current                       |         |     | -0.8 |         |     | -0.8 | mA    |
| I <sub>OL</sub> | Low Level Output Current                        |         |     | 16   |         |     | 16   | mA    |
| T <sub>A</sub>  | Free Air Operating Temperature                  | -55     |     | 125  | 0       |     | 70   | °C    |

## Electrical Characteristics over recommended operating free air temperature (unless otherwise noted)

| Symbol           | Parameter                                 | Conditions   | Min         | Typ (Note 2) | Max  | Units |
|------------------|---|--|-------------|--------------|------|-------|
| V <sub>I</sub>   | Input Clamp Voltage                       | V <sub>CC</sub> = Min, I <sub>I</sub> = -12 mA                                       |             |              | -1.5 | V     |
| V <sub>OH</sub>  | High Level Output Voltage                 | V <sub>CC</sub> = Min, I <sub>OH</sub> = Max<br>V <sub>I</sub> = V <sub>T-</sub> Min | DM54<br>2.4 | 3.4          |      | V     |
| V <sub>OL</sub>  | Low Level Output Voltage                  | V <sub>CC</sub> = Min, I <sub>OL</sub> = Max<br>V <sub>I</sub> = V <sub>T+</sub> Max |             | 0.2          | 0.4  | V     |
| I <sub>T+</sub>  | Input Current at Positive-Going Threshold | V <sub>CC</sub> = 5V, V <sub>I</sub> = V <sub>T+</sub>                               |             | -0.43        |      | mA    |
| I <sub>T-</sub>  | Input Current at Negative-Going Threshold | V <sub>CC</sub> = 5V, V <sub>I</sub> = V <sub>T-</sub>                               |             | -0.56        |      | mA    |
| I <sub>I</sub>   | Input Current @ Max Input Voltage         | V <sub>CC</sub> = Max, V <sub>I</sub> = 5.5V   |             |              | 1    | mA    |
| I <sub>IH</sub>  | High Level Input Current                  | V <sub>CC</sub> = Max, V <sub>I</sub> = 2.4V   |             |              | 40   | μA    |
| I <sub>IL</sub>  | Low Level Input Current                   | V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V   |             | -0.8         | -1.2 | mA    |
| I <sub>OS</sub>  | Short Circuit Output Current              | V <sub>CC</sub> = Max (Note 3)   | DM54<br>-18 |              | -55  | mA    |
|                  |   |  | DM74<br>-18 |              | -55  |       |
| I <sub>CCH</sub> | Supply Current with Outputs High          | V <sub>CC</sub> = Max  |             | 15           | 24   | mA    |
| I <sub>CCL</sub> | Supply Current with Outputs Low           | V <sub>CC</sub> = Max  |             | 26           | 40   | mA    |

Note 1: V<sub>CC</sub> = 5V.

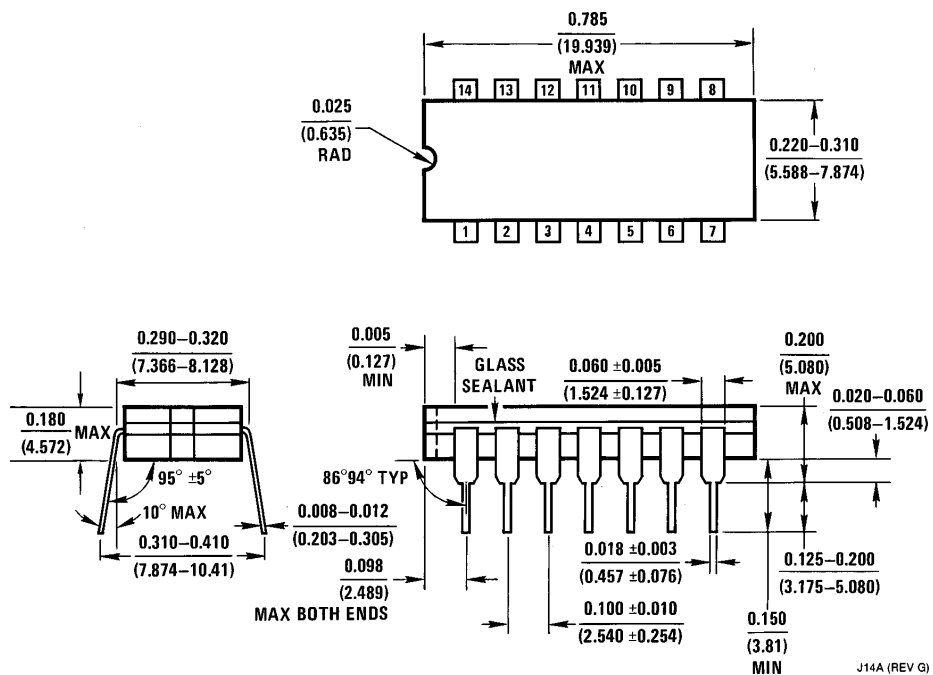
Note 2: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Note 3: Not more than one output should be shorted at a time.

**Switching Characteristics** at  $V_{CC} = 5V$  and  $T_A = 25^\circ C$  (See Section 1 for Test Waveforms and Output Load)

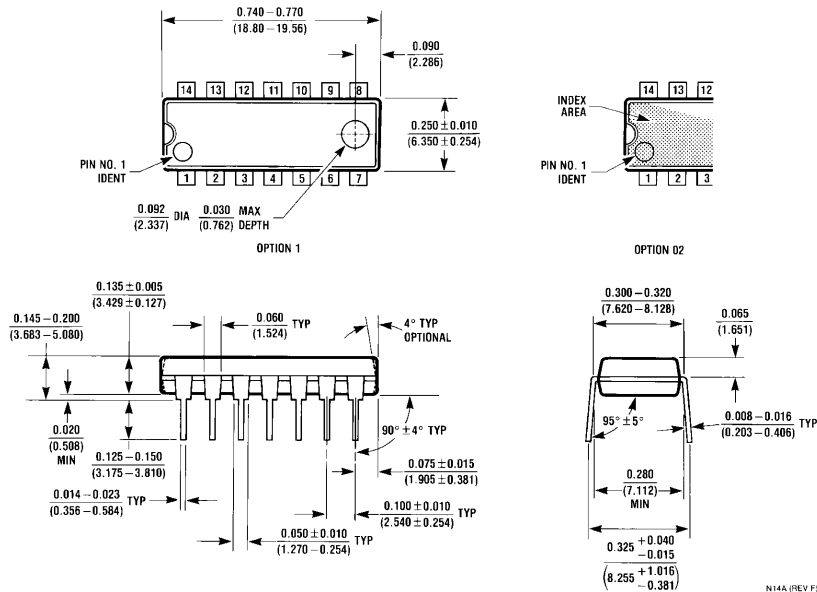
| Symbol    | Parameter  | $R_L = 400\Omega$<br>$C_L = 15\text{ pF}$ |     | Units |
|-----------|--|---|-----|-------|
|           |  | Min                                       | Max |       |
| $t_{PLH}$ | Propagation Delay Time<br>Low to High Level Output |   | 22  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>High to Low Level Output |   | 22  | ns    |

**Physical Dimensions** inches (millimeters)



**14-Lead Ceramic Dual-In-Line Package (J)**  
Order Number DM54132J  
NS Package Number J14A

**Physical Dimensions** inches (millimeters) (Continued)



**14-Lead Molded Dual-In-Line Package (N)**  
**Order Number DM74132N**  
**NS Package Number N14A**

N14A (REV F)

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