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## NTE7413 Integrated Circuit TTL – Dual 4–Input Positive NAND Schmitt Trigger

**Description:**

The NTE7413 is a dual 4–Input NAND Schmitt trigger in a 14–Lead plastic DIP type package. The device is temperature–compensated and can be triggered from the slowest of input ramps and still give clean, jitter–free output signals.

**Absolute Maximum Ratings:** (Note 1)

Supply Voltage,  $V_{CC}$  ..... 7V  
 DC Input Voltage,  $V_{IN}$  ..... 5.5V  
 Operating Temperature Range,  $T_A$  ..... 0°C to +70°C  
 Storage Temperature Range,  $T_{stg}$  ..... –65°C to +150°C

Note 1. Unless otherwise specified, all voltages are referenced to GND.

**Recommended Operating Conditions:**

| Parameter                   | Symbol   | Min  | Typ | Max  | Unit |
|-----------------------------|----------|------|-----|------|------|
| Supply Voltage              | $V_{CC}$ | 4.75 | 5.0 | 5.25 | V    |
| High–Level Output Current   | $I_{OH}$ | –    | –   | –0.8 | mA   |
| Low–Level Output Current    | $I_{OL}$ | –    | –   | 16   | mA   |
| Operating Temperature Range | $T_A$    | 0    | –   | +70  | °C   |

**Electrical Characteristics:** (Note 2, Note 3)

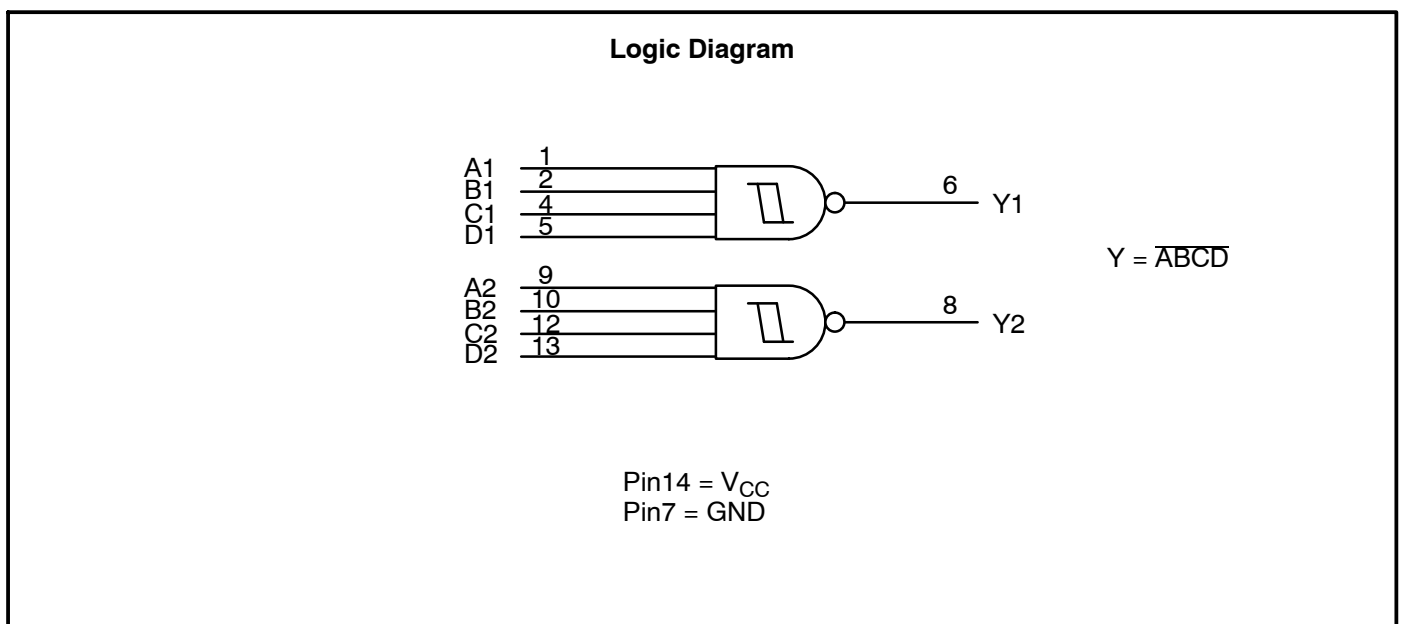
| Parameter                        | Symbol    | Test Conditions   | Min | Typ   | Max  | Unit          |
|----------------------------------|-----------|---|-----|-------|------|---------------|
| Positive-Going Threshold Voltage | $V_{T+}$  | $V_{CC} = 5V$   | 1.5 | 1.7   | 2.0  | V             |
| Negative-Going Threshold Voltage | $V_{T-}$  | $V_{CC} = 5V$   | 0.6 | 0.9   | 1.1  | V             |
| Hysteresis Voltage               | $V_H$     | $V_{CC} = 5V$   | 0.4 | 0.8   | -    | V             |
| Input Clamp Voltage              | $V_{IK}$  | $V_{CC} = \text{MIN}, I_I = -12\text{mA}$                 | -   | -     | -1.5 | V             |
| High Level Output Voltage        | $V_{OH}$  | $V_{CC} = \text{MIN}, V_I = 0.6V, I_{OH} = -0.8\text{mA}$ | 2.4 | 3.4   | -    | V             |
| Low Level Output Voltage         | $V_{OL}$  | $V_{CC} = \text{MIN}, V_I = 12V, I_{OL} = 16\text{mA}$    | -   | 0.2   | 0.4  | V             |
| Positive-Going Threshold Current | $I_{T+}$  | $V_{CC} = 5V, V_I = V_{T+}$                               | -   | -0.65 | -    | mA            |
| Negative-Going Threshold Current | $I_{T-}$  | $V_{CC} = 5V, V_I = V_{T-}$                               | -   | -0.85 | -    | mA            |
| Input Current                    | $I_I$     | $V_{CC} = \text{MAX}, V_I = 5.5V$                         | -   | -     | 1    | mA            |
| High Level Input Current         | $I_{IH}$  | $V_{CC} = \text{MAX}, V_I = 2.4V$                         | -   | -     | 40   | $\mu\text{A}$ |
| Low Level Input Current          | $I_{IL}$  | $V_{CC} = \text{MAX}, V_I = 0.4V$                         | -   | -1.0  | -1.6 | mA            |
| Short-Circuit Output Current     | $I_{OS}$  | $V_{CC} = \text{MAX}, \text{Note 4}$                      | -18 | -     | -55  | mA            |
| High Level Supply Current        | $I_{CCH}$ | $V_{CC} = \text{MAX}$                                     | -   | 14    | 23   | mA            |
| Low Level Supply Current         | $I_{CCL}$ | $V_{CC} = \text{MAX}$                                     | -   | 20    | 32   | mA            |

Note 2. For conditions shown as MIN or MAX, use the appropriate value specified under "Recommended Operation Conditions".

Note 3. All typical values are at  $V_{CC} = 5V, T_A = +25^\circ\text{C}$ .

**Switching Characteristics:** ( $V_{CC} = 5V, T_A = +25^\circ\text{C}$  unless otherwise specified)

| Parameter   | Symbol    | Test Conditions                      | Min | Typ | Max | Unit |
|---|-----------|--------------------------------------|-----|-----|-----|------|
| Propagation Delay Time<br>From Any Input to Y Output) | $t_{PLH}$ | $R_L = 400\Omega, C_L = 15\text{pF}$ | -   | 18  | 27  | ns   |
|   | $t_{PHL}$ |                                      | -   | 15  | 22  | ns   |



### Pin Connection Diagram

