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NTE74LS540 & NTE74LS541 Integrated Circuit TTL- Octal Buffer and Line Driver w/3-State Outputs

Description:

The NTE74LS540 (Inverting) and NTE74LS541 (Non-Inverting) are octal buffers and line drivers in a 20-Lead DIP type package designed to have the same performance as the NTE74LS240 and NTE74LS241 and, at the same time, offer a pinout having the inputs and outputs on opposite sides of the package. This arrangement greatly enhances printed circuit board layout.

The three-state control gate is a 2-input NOR such that if either $\overline{G1}$ or $\overline{G2}$ are high, all eight outputs are in the high-impedance state.

Features:

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- PNP Inputs Reduce DC Loading
- Hysteresis at Inputs Improves Noise Margins
- Data Flow-thru Pinout (All Inputs on Opposite Side from Outputs)

Absolute Maximum Ratings: (Note 1)

| | |
|--|-----------------|
| Supply Voltage, V_{CC} | 7V |
| Input Voltage, V_{IN} | 7V |
| Power Dissipation | |
| NTE74LS540 | 92.5mW |
| NTE74LS541 | 120mW |
| Operating Temperature Range, T_A | 0°C to +70°C |
| Storage Temperature Range, T_{stg} | -65°C to +150°C |

Note 1. Voltage values are with respect to the network ground terminal.

Recommended Operating Conditions:

| Parameter | Symbol | Min | Typ | Max | Unit |
|-----------------------------|----------|------|-----|------|------|
| Supply Voltage (Note 1) | V_{CC} | 4.75 | 5.0 | 5.25 | V |
| High-Level Output Current | I_{OH} | - | - | -15 | mA |
| Low-Level Output Current | I_{OL} | - | - | 24 | mA |
| Operating Temperature Range | T_A | 0 | - | +70 | °C |

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

Electrical Characteristics: (Note 2, Note 3)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--|-------------------|--|------------------------|-----|------|---------------|---------------|
| High-Level Input Voltage | V_{IH} | | 2 | - | - | V | |
| Low-Level Input Voltage | V_{IL} | | - | - | 0.6 | V | |
| Input Clamp Voltage | V_{IK} | $V_{CC} = \text{MIN}, I_I = -18\text{mA}$ | - | - | -1.5 | V | |
| Hysteresis | $V_{T+} - V_{T-}$ | $V_{CC} = \text{MIN}$ | 0.2 | 0.4 | - | V | |
| High Level Output Voltage | V_{OH} | $V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = \text{MAX}, I_{OH} = -3\text{mA}$ | 2.4 | 3.4 | - | V | |
| | | $V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = 0.5\text{V}, I_{OH} = \text{MAX}$ | 2.0 | - | - | V | |
| Low Level Output Voltage | V_{OL} | $V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = \text{MAX}$ | $I_{OL} = 12\text{mA}$ | - | 0.25 | 0.4 | V |
| | | | $I_{OL} = 24\text{mA}$ | - | 0.35 | 0.5 | V |
| Off-State Output Current | I_{OZ} | $V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = \text{MAX}$ | $V_O = 2.7\text{V}$ | - | - | 20 | μA |
| | | | $V_O = .4\text{V}$ | - | - | -20 | μA |
| Input Current | I_I | $V_{CC} = \text{MAX}, V_I = 7\text{V}$ | - | - | 0.1 | mA | |
| High-Level Input Current | I_{IH} | $V_{CC} = \text{MAX}, V_I = 2.7\text{V}$ | - | - | 20 | μA | |
| Low-Level Input Current | I_{IL} | $V_{CC} = \text{MAX}, V_{IL} = 0.4\text{V}$ | - | - | -0.2 | mA | |
| Short-Circuit Output Current | I_{OS} | $V_{CC} = \text{MAX}, \text{Note 4}$ | -40 | - | -225 | mA | |
| Supply Current NTE74LS540 NTE74LS541 NTE74LS540 NTE74LS541 NTE74LS540 NTE74LS541 | I_{CC} | $V_{CC} = \text{MAX}, \text{Output Open}$ | Outputs High | - | 13 | 25 | mA |
| | | | | - | 18 | 32 | mA |
| | | | Outputs Low | - | 24 | 45 | mA |
| | | | | - | 30 | 52 | mA |
| | | | All Outputs Disabled | - | 30 | 52 | mA |
| | | | | - | 32 | 55 | 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 $V_{CC} = 5\text{V}, T_A = +25^\circ\text{C}$.

Note 4. Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

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

| Parameter | Symbol | Test Conditions | NTE74LS540 | | | NTE74LS541 | | | Unit |
|------------------------|-----------|--------------------------------------|------------|-----|-----|------------|-----|-----|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Propagation Delay Time | t_{PLH} | $R_L = 667\Omega, C_L = 45\text{pF}$ | - | 9 | 15 | - | 9 | 15 | ns |
| | t_{PHL} | | - | 9 | 15 | - | 10 | 18 | ns |
| Output Enable Time | t_{PZL} | | - | 25 | 38 | - | 25 | 38 | ns |
| | t_{PZH} | | - | 15 | 25 | - | 20 | 32 | ns |
| Output Disable Time | t_{PLZ} | $R_L = 667\Omega, C_L = 5\text{pF}$ | - | 10 | 18 | - | 10 | 18 | ns |
| | t_{PHZ} | | - | 15 | 25 | - | 18 | 29 | ns |

Pin Connection Diagram

