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# NTE74H60

## Integrated Circuit

### TTL – High Speed, Dual 4–Input Expander

### 14–Lead DIP

#### Recommended Operating Conditions:

| Parameter                                                                            | Symbol   | Min  | Typ | Max  | Unit |
|--------------------------------------------------------------------------------------|----------|------|-----|------|------|
| Supply Voltage                                                                       | $V_{CC}$ | 4.75 | 5.0 | 5.25 | V    |
| Operating Temperature Range                                                          | $T_A$    | 0    | +25 | +70  | °C   |
| Maximum Number of Expanders that may be Fanned in to one Expander AND/OR Invert Gate |          | –    | –   | 4    |      |

#### Electrical Characteristics: (Note 1, Note 2 unless otherwise specified)

| Parameter                                                                                | Symbol        | Test Conditions                                                                                                | Min                       | Typ  | Max  | Unit              |
|------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------|---------------------------|------|------|-------------------|
| Input HIGH Voltage                                                                       | $V_{IH}$      | Note 3                                                                                                         | 2.0                       | –    | –    | V                 |
| Input LOW Voltage                                                                        | $V_{IL}$      | Note 4                                                                                                         | –                         | –    | 0.8  | V                 |
| On–State Output Voltage                                                                  | $V_{ON}$      | $V_{CC} = \text{MIN}, V_{IN} = 2.0\text{V}, V_1 = 1.0\text{V}, T_A = 0^\circ\text{C}, I_{ON} = 6.3\text{mA}$   | –                         | –    | 0.4  | V                 |
|                                                                                          |               | $V_{CC} = \text{MAX}, V_{IN} = 2.0\text{V}, V_1 = 0.6\text{V}, T_A = +70^\circ\text{C}, I_{ON} = 7.4\text{mA}$ | –                         | –    | 0.4  | V                 |
| Output LOW Voltage                                                                       | $V_{OL}$      | $V_{CC} = \text{MIN}, I_{OH} = 20\text{mA}, V_{IN} = 2.0\text{V}$                                              | –                         | –    | 0.4  | V                 |
| Off–State Output Current                                                                 | $I_{OFF}$     | $V_{CC} = \text{MIN}, V_{IN} = 0.8\text{V}, V_1 = 4.5\text{V}, R = 575\Omega$                                  | $T_A = -55^\circ\text{C}$ | –    | –    | 320 $\mu\text{A}$ |
|                                                                                          |               |                                                                                                                | $T_A = 0^\circ\text{C}$   | –    | –    | 570 mA            |
| On–State Output Current                                                                  | $I_{ON}$      | $V_{CC} = \text{MIN}, V_{IN} = 2.0\text{V}, V_1 = 1.0\text{V}$                                                 | $T_A = -55^\circ\text{C}$ | –470 | –    | $\mu\text{A}$     |
|                                                                                          |               |                                                                                                                | $T_A = 0^\circ\text{C}$   | –600 | –    | mA                |
| Input HIGH Current                                                                       | $I_{IH}$      | $V_{CC} = \text{MAX}, V_{IN} = 2.4\text{V}$                                                                    | Each Input                | –    | –    | 50 $\mu\text{A}$  |
|                                                                                          |               | $V_{CC} = \text{MAX}, V_{IN} = 5.5\text{V}$                                                                    |                           | –    | –    | 1.0 mA            |
| Input LOW Current                                                                        | $I_{IL}$      | $V_{CC} = \text{MAX}, V_{IN} = 0.4\text{V}, \text{Each Input}$                                                 | –                         | –    | –2.0 | mA                |
| On–State Supply Current                                                                  | $I_{CC(ON)}$  | $V_{CC} = \text{MAX}, V_{IN} = 4.5\text{V}, V_1 = 0.85\text{V}$                                                | –                         | 1.9  | 3.5  | mA                |
| Off–State Supply Current                                                                 | $I_{CC(OFF)}$ | $V_{CC} = \text{MAX}, V_{IN} = 0\text{V}, V_1 = 0.85\text{V}$                                                  | –                         | 3.0  | 4.5  | mA                |
| <b>Output Capacitance</b> ( $V_{CC}$ and GND Terminals Open, $T_A = +25^\circ\text{C}$ ) |               |                                                                                                                |                           |      |      |                   |
| Effective Capacitance of Output Transistor $Q_1$                                         | $C_X$         | $f = 1\text{MHz}$                                                                                              | –                         | 1.3  | –    | pF                |

Note 1. For conditions shown as MIN. or MAX., use the appropriate value specified under the “Recommended Operating Conditions”.

Note 2. Typical limits are at  $V_{CC} = 5.0\text{V}, +25^\circ\text{C}$ .

Note 3. Required at all input terminals to ensure output is in the on–state.

Note 4. Required at any input terminal to ensure output is in the off–state.

### Pin Connection Diagram

