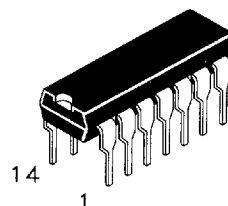


## Hex Inverter

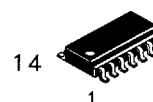
This device contains six independent gates, each of which performs the logic INVERT function.

- AVG's LS operates over extended Vcc from 4.5 to 5.5 V
- AVG's LS and ALS both have guaranteed DC and AC specification over full temperature and Vcc range
- Switching specifications for ALS at 50 pF
- AVG's ALS has the lowest speed power product (4pJ per gate typical) of all logic series

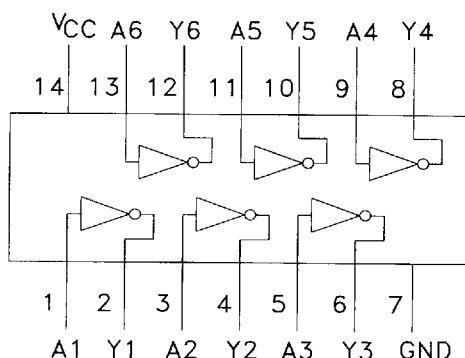
### DV74LS04 DV74ALS04B



N Suffix  
Plastic DIP  
AVG-001 Case



D Suffix  
Plastic SOP  
AVG-002 Case



### TRUTH TABLE $Y = \overline{A}$

| Inputs | Outputs |
|--------|---------|
| A      | Y       |
| L      | H       |
| H      | L       |

H = High Logic Level  
L = Low Logic Level

### ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

| Symbol           | Parameter                 | LS04        | ALS04B      | Unit |
|------------------|---------------------------|-------------|-------------|------|
| V <sub>CC</sub>  | Supply Voltage            | 7.0         | 7.0         | V    |
| V <sub>IN</sub>  | Input Voltage             | 7.0         | 7.0         | V    |
| T <sub>STG</sub> | Storage Temperature Range | -65 to +150 | -65 to +150 | °C   |

### GUARANTEED OPERATING CONDITIONS

| Symbol          | Parameter                 | LS04       |      | ALS04B     |      | Unit |
|-----------------|---------------------------|------------|------|------------|------|------|
|                 |                           | Min        | Max  | Min        | Max  |      |
| V <sub>CC</sub> | Supply Voltage            | 4.5        | 5.5  | 4.5        | 5.5  | V    |
| V <sub>IH</sub> | High Level Input Voltage  | 2.0        |      | 2.0        |      | V    |
| V <sub>IL</sub> | Low Level Input Voltage   |            | 0.8  |            | 0.8  | V    |
| I <sub>OH</sub> | High Level Output Current |            | -0.4 |            | -0.4 | mA   |
| I <sub>OL</sub> | Low Level Output Current  |            | 8.0  |            | 8.0  | mA   |
| T <sub>A</sub>  | Ambient Temperature Range | -10 to +70 |      | -10 to +70 |      | °C   |

**DC ELECTRICAL CHARACTERISTICS** over full operating conditions

| Symbol   | Parameter                                     | Conditions                                | LS04       |      |      | ALS04B     |      |      | Unit          |
|----------|-----------------------------------------------|-------------------------------------------|------------|------|------|------------|------|------|---------------|
|          |                                               |                                           | Min        | Typ  | Max  | Min        | Typ  | Max  |               |
| $V_{IK}$ | Input Clamp Voltage                           | $V_{CC} = \min, I_{IN} = -18 \text{ mA}$  |            |      | -1.5 |            |      | -1.5 | V             |
| $V_{OH}$ | High Level Output Voltage                     | $V_{CC} = \min, I_{OH} = \max$            | $V_{CC}-2$ | 3.5  |      | $V_{CC}-2$ |      |      | V             |
| $V_{OL}$ | Low Level Output Voltage                      | $V_{CC} = \min$                           |            |      |      |            |      |      |               |
|          |                                               | $V_{CC} = \min; I_{OL} = 4 \text{ mA}$    |            | 0.25 | 0.4  |            | 0.25 | 0.4  | V             |
|          |                                               | $V_{CC} = \min; I_{OL} = 8 \text{ mA}$    |            | 0.35 | 0.5  |            | 0.35 | 0.5  | V             |
| $I_{IH}$ | High Level Input Current                      | $V_{CC} = \max, V_{IN} = 2.7 \text{ V}$   |            |      | 20   |            |      | 20   | $\mu\text{A}$ |
|          |                                               | $V_{CC} = \max, V_{IN} = 7 \text{ V}$     |            |      | 0.1  |            |      | 0.1  | mA            |
| $I_{IL}$ | Low Level Input Current                       | $V_{CC} = \max, V_{IN} = 0.4 \text{ V}$   |            |      | -0.4 |            |      | -0.1 | mA            |
| $I_O$    | Output Short Circuit Current                  | $V_{CC} = \max, V_{OUT} = 2.25 \text{ V}$ | -20        |      | -110 | -30        |      | -112 | mA            |
| $I_{CC}$ | Supply Current<br>Outputs High<br>Outputs Low | $V_{CC} = \max$                           |            |      | 2.4  |            | 0.65 | 1.1  | mA            |
|          |                                               |                                           |            |      | 6.6  |            | 2.9  | 4.2  | mA            |

**SWITCHING CHARACTERISTICS** over full operating conditions

| Symbol    | Parameter                                           | From  | To     | LS04<br>CL=15 pF |     | ALS04B<br>CL=50pF<br>RL = 500 $\Omega$ |     | Unit |
|-----------|-----------------------------------------------------|-------|--------|------------------|-----|----------------------------------------|-----|------|
|           |                                                     |       |        | Min              | Max | Min                                    | Max |      |
| $t_{PLH}$ | Propagation Delay Time,<br>Low to High Level Output | Input | Output |                  | 15  | 3                                      | 11  | ns   |
| $t_{PHL}$ | Propagation Delay Time,<br>High to Low Level Output | Input | Output |                  | 15  | 2                                      | 8   | ns   |

**SWITCHING WAVEFORMS**