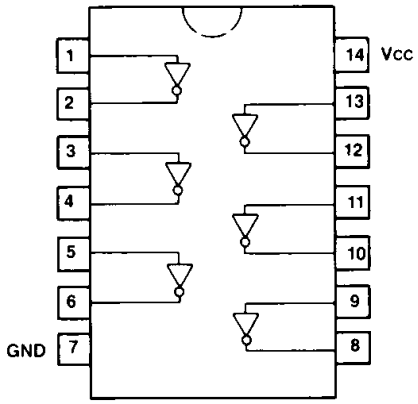
## Hex Inverter

The LS04 is a bipolar, NPN, sealed-junction, silicon integrated circuit. It is manufactured in low-power Schottky technology and is available in a wire-bonded, 14-pin plastic DIP or surface mount package.




## Electrical Characteristics

$V_{CC}$ = 5.0 ±0.5 V, $T_A$ = −55 to +125°C (WA-LS)
$V_{CC}$ = 5.0 ±0.25 V, $T_A$ = 0 to 70°C (WP90222L3)
$V_{CC}$ = 5.0 ±0.5 V, $T_A$ = −40 to +85°C (WA-LSD, WP91397L3)

| | | WA-LS | | WP, WA-LSD | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Max** | **Min** | **Max** | **Units** |
| Output Voltage, $V_{CC}$ = 4.5 V (WA-LS), 4.75 V (WP, WA-LSD) | | | | | | |
| Low, $I_{OL}$ = 4.0 mA | $V_{OL}$ | — | 0.4 | — | 0.4 | V |
| $I_{OL}$ = 8.0 mA | $V_{OL}$ | — | 0.5 | — | 0.5 | V |
| High, $I_{OH}$ = −0.4 mA | $V_{OH}$ | 2.5 | — | 2.7 | — | V |
| Input Voltage, $V_{CC}$ = 4.5 V (WA-LS), 4.75 V (WP, WA-LSD) | | | | | | |
| Low | $V_{IL}$ | — | 0.7 | — | 0.8* | V |
| High | $V_{IH}$ | 2.0 | 7.5 | 2.0 | 5.5 | V |
| Clamp, $I_{IN}$ = −18.0 mA | $V_{IK}$ | — | −1.5 | — | −1.5 | V |
| Input Current, $V_{CC}$ = 5.5 V (WA-LS), 5.25 V (WP, WA-LSD) | | | | | | |
| Low, $V_{IL}$ = 0.4 V | $I_{IL}$ | — | −0.4 | — | −0.4 | mA |
| High, $V_{IH}$ = 2.7 V | $I_{IH}$ | — | 20.0 | — | 20.0 | μA |
| @ $V_I$ max, $V_I$ = 7.0 V (WA-LS), 5.5 V (WP, WA-LSD) | $I_I$ | — | 0.1 | — | 0.1 | mA |
| Output Current, $V_{CC}$ = 5.5 V (WA-LS), 5.25 V (WP, WA-LSD) | | | | | | |
| Short-Circuit | $I_{OS}$ | −20.0 | −100.0 | −20.0 | −100.0 | mA |
| Supply Current, $V_{CC}$ = 5.5 V (WA-LS), 5.25 V (WP, WA-LSD) | | | | | | |
| Output Low | $I_{CCL}$ | — | 6.6 | — | 6.6 | mA |
| Output High | $I_{CCH}$ | — | 2.4 | — | 2.4 | mA |

* WA-LSD, WP91397L3: $V_{IL}$ = 0.7 V



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## Timing Characteristics

$V_{CC}$ = 5.0 V, $T_A$ = 25°C, $C_L$ = 15 pF

| | | WA-LS | | WP, WA-LSD | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Max** | **Min** | **Max** | **Units** |
| Propagation Delay | | | | | | |
| Low-to-High | $t_{PLH}$ | — | 10.0 | — | 15.0 | ns |
| High-to-Low | $t_{PHL}$ | — | 10.0 | — | 15.0 | ns |

## Maximum Ratings

Power supply voltage ($V_{CC}$) . . . . . 7.0 V
Operating temperature ($T_A$) . . . . . WA-LS: −55 to +125°C
WP90222L3: 0 to 70°C
WA-LSD, WP91397L3: −40 to +85°C
Storage temperature ($T_{stg}$) . . . . . −65 to +150°C

Maximum ratings are defined as the limiting conditions that the user can apply to the device under all variations of circuit and environmental conditions. If any rating is exceeded, permanent damage to the device may result.

Bonding or soldering of the external leads of this device can be performed safely at temperatures up to 300°C.



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