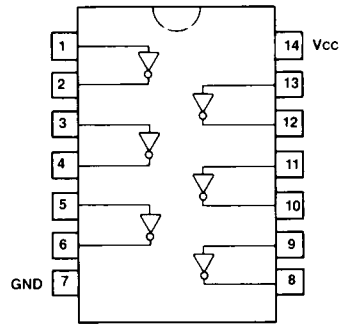


# LS04

## 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<sub>CC</sub> = 5.0 ±0.5 V, T<sub>A</sub> = -55 to +125°C (WA-LS)

V<sub>CC</sub> = 5.0 ±0.25 V, T<sub>A</sub> = 0 to 70°C (WP90222L3)

V<sub>CC</sub> = 5.0 ±0.5 V, T<sub>A</sub> = -40 to +85°C (WA-LSD, WP91397L3)

Parameter	Symbol	WA-LS		WP, WA-LSD		Units
		Min	Max	Min	Max	
Output Voltage, V <sub>CC</sub> = 4.5 V (WA-LS), 4.75 V (WP, WA-LSD)						
Low, I <sub>OL</sub> = 4.0 mA	V <sub>OL</sub>	—	0.4	—	0.4	V
I <sub>OL</sub> = 8.0 mA	V <sub>OL</sub>	—	0.5	—	0.5	V
High, I <sub>OH</sub> = -0.4 mA	V <sub>OH</sub>	2.5	—	2.7	—	V
Input Voltage, V <sub>CC</sub> = 4.5 V (WA-LS), 4.75 V (WP, WA-LSD)						
Low	V <sub>IL</sub>	—	0.7	—	0.8*	V
High	V <sub>IH</sub>	2.0	7.5	2.0	5.5	V
Clamp, I <sub>IN</sub> = -18.0 mA	V <sub>IK</sub>	—	-1.5	—	-1.5	V
Input Current, V <sub>CC</sub> = 5.5 V (WA-LS), 5.25 V (WP, WA-LSD)						
Low, V <sub>IL</sub> = 0.4 V	I <sub>IL</sub>	—	-0.4	—	-0.4	mA
High, V <sub>IH</sub> = 2.7 V	I <sub>IH</sub>	—	20.0	—	20.0	μA
@ V <sub>I</sub> max, V <sub>I</sub> = 7.0 V (WA-LS), 5.5 V (WP, WA-LSD)	I <sub>I</sub>	—	0.1	—	0.1	mA
Output Current, V <sub>CC</sub> = 5.5 V (WA-LS), 5.25 V (WP, WA-LSD)						
Short-Circuit	I <sub>OS</sub>	-20.0	-100.0	-20.0	-100.0	mA
Supply Current, V <sub>CC</sub> = 5.5 V (WA-LS), 5.25 V (WP, WA-LSD)						
Output Low	I <sub>CC</sub> L	—	6.6	—	6.6	mA
Output High	I <sub>CC</sub> H	—	2.4	—	2.4	mA

\* WA-LSD, WP91397L3: V<sub>IL</sub> = 0.7 V

**Timing Characteristics**V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = 25°C, C<sub>L</sub> = 15 pF

		WA-LS		WP, WA-LSD		
Parameter	Symbol	Min	Max	Min	Max	Units
Propagation Delay						
Low-to-High	t <sub>PLH</sub>	—	10.0	—	15.0	ns
High-to-Low	t <sub>PHL</sub>	—	10.0	—	15.0	ns

**Maximum Ratings**Power supply voltage (V<sub>CC</sub>) ..... 7.0 VOperating temperature (T<sub>A</sub>) ..... WA-LS: -55 to +125°C  
WP90222L3: 0 to 70°CStorage temperature (T<sub>stg</sub>) ..... WA-LSD, WP91397L3: -40 to +85°C  
-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.