Hex inverter

74ALS04B

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74ALS04B	3.5ns	2.0mA
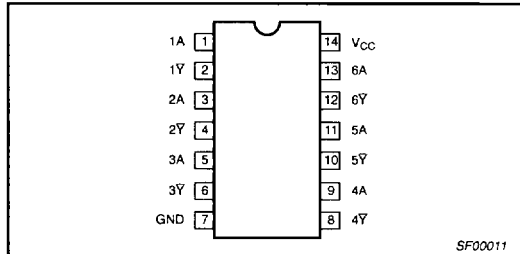
ORDERING INFORMATION

DESCRIPTION	ORDER CODE	DRAWING NUMBER
	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$, $T_{amb} = 0°C$ to $+70°C$	
14-pin plastic DIP	74ALS04BN	SOT27-1
14-pin plastic SO	74ALS04BD	SOT108-1
14-pin plastic SSOP Type II	74ALS04BDB	SOT337-1

PIN CONFIGURATION

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74ALS (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
nA	Data input	1.0/1.0	20µA/0.1mA
nY	Data output	20/80	0.4mA/8mA

NOTE: One (1.0) ALS unit load is defined as: 20µA in the High state and 0.1mA in the Low state.
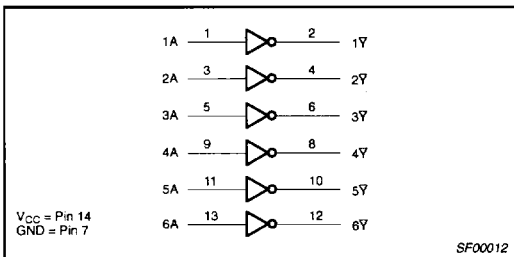
LOGIC SYMBOL

V_{CC} = Pin 14
GND = Pin 7
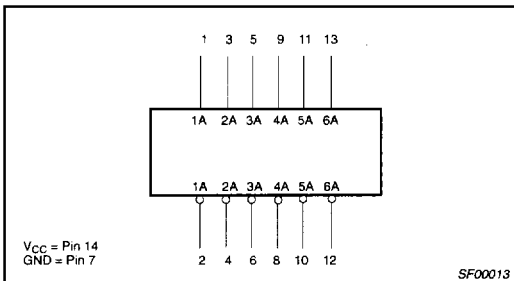
IEC/IEEE SYMBOL

LOGIC DIAGRAM

V_{CC} = Pin 14
GND = Pin 7
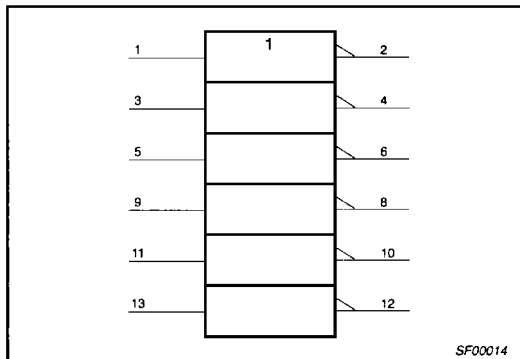
FUNCTION TABLE

INPUT	OUTPUT
nA	nY
L	H
H	L

H = High voltage level
L = Low voltage level

Hex inverter   74ALS04B

ABSOLUTE MAXIMUM RATINGS
(Operation beyond the limit set forth in this table may impair the useful life of the device.
Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	−0.5 to +7.0	V
V_{IN}	Input voltage	−0.5 to +7.0	V
I_{IN}	Input current	−30 to +5	mA
V_{OUT}	Voltage applied to output in High output state	−0.5 to V_{CC}	V
I_{OUT}	Current applied to output in Low output state	16	mA
T_{amb}	Operating free-air temperature range	0 to +70	°C
T_{stg}	Storage temperature range	−65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5.0	5.5	V
V_{IH}	High-level input voltage	2.0			V
V_{IL}	Low-level input voltage			0.8	V
I_{Ik}	Input clamp current			−18	mA
I_{OH}	High-level output current			−0.4	mA
I_{OL}	Low-level output current			8	mA
T_{amb}	Operating free-air temperature range	0		+70	°C

DC ELECTRICAL CHARACTERISTICS
(Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS[1]		LIMITS			UNIT
				MIN	TYP[2]	MAX	
V_{OH}	High-level output voltage	$V_{CC}\pm10\%$, V_{IL} = MAX, V_{IH} = MIN, I_{OH} = −0.4mA		$V_{CC}-2$			V
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IL} = MAX, V_{IH} = MIN	I_{OL} = 4mA		0.25	0.40	V
			I_{OL} = 8mA		0.35	0.50	V
V_{IK}	Input clamp voltage	V_{CC} = MIN, I_I = I_{IK}			-0.73	-1.5	V
I_I	Input current at maximum input voltage	V_{CC} = MAX, V_I = 7.0V				0.1	mA
I_{IH}	High-level input current	V_{CC} = MAX, V_I = 2.7V				20	µA
I_{IL}	Low-level input current	V_{CC} = MAX, V_I = 0.5V				-0.1	mA
I_O	Output current[3]	V_{CC} = MAX, V_O = 2.25V		-30		-112	mA
I_{CC}	Supply current (total)	I_{CCH}	V_{CC} = MAX	V_I = GND		0.75	1.1	mA
		I_{CCL}		V_I = 4.5V		3.2	4.2	mA

NOTES:
1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
2. All typical values are at V_{CC} = 5V, T_{amb} = 25°C.
3. The output conditions have been chosen to produce a current that closely approximate one half of the true short-circuit output current, I_{OS}.
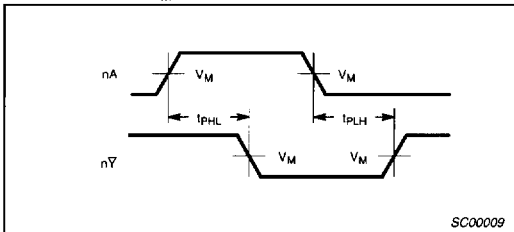
AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS $T_{amb} = 0°C$ to $+70°C$ $V_{CC} = +5.0V \pm 10\%$ $C_L = 50pF$, $R_L = 500\Omega$		UNIT
			MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay nA to nY	Waveform 1	2.0 2.0	11.0 8.0	ns

AC WAVEFORMS

For all waveforms, $V_M = 1.3V$.

SC00009

Waveform 1.   Propagation Delay for Data to Output

TEST CIRCUIT AND WAVEFORMS

Test Circuit for Totem-pole Outputs

Input Pulse Definition

DEFINITIONS:
R_L = Load resistor;
    see AC electrical characteristics for value.
C_L = Load capacitance includes jig and probe capacitance;
    see AC electrical characteristics for value.
R_T = Termination resistance should be equal to Z_{OUT} of
    pulse generators.

Family	INPUT PULSE REQUIREMENTS					
	Amplitude	V_M	Rep.Rate	t_w	t_{TLH}	t_{THL}
74ALS	3.5V	1.3V	1MHz	500ns	2.0ns	2.0ns

SC00005