## FEATURES

- Wide Operating Voltage Range of 2.0V to 6.0V
- Outputs Can Drive up to 10 LSTTL Loads
- Low Power Consumption, 20µA Maximum I_{CC}
- Typical t_{pd}: 8ns
- ±4mA Output Drive at 5.0V
- Low Input Current of 1µA Maximum

APPLICATIONS

- Cameras
- E-Meters
- Ethernet Switches
- Infotainment

DESCRIPTION

The 74HC04 types consist of six inverter circuits. They perform the Boolean function $Y= \overline{A}$ in positive logic.   Each of the six inverters is a single stage.
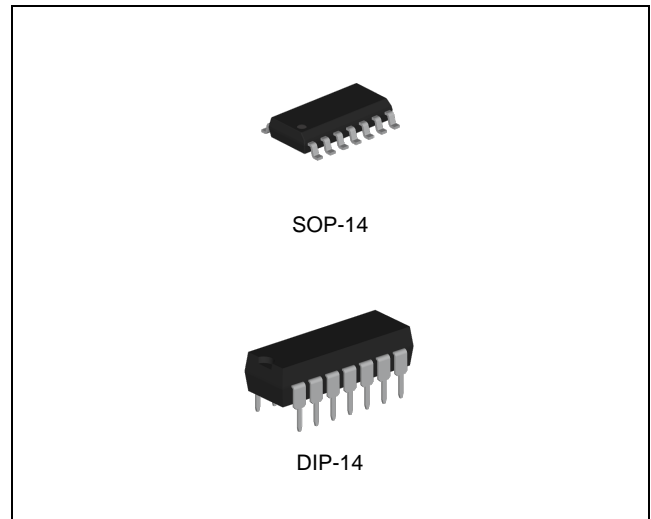
SOP-14

DIP-14

ORDERING INFORMATION

Device	Package
74HC04D	SOP-14
74HC04N	DIP-14

ABSOLUTE MAXIMUM RATINGS [Note 1]

CHARACTERISTIC		SYMBOL	MIN.	MAX.	UNIT
DC Supply Voltage		V_{CC}	−0.5	7	V
Input Clamp Current [Note 2]	$V_I < 0$ or $V_I > V_{CC}$	I_{IK}	-	±20	mA
Output Clamp Current [Note 2]	$V_O < 0$	I_{OK}	-	±20	mA
Continuous Output Current	$V_O = 0$ to V_{CC}	I_{IN}	-	±25	mA
Continuous Current through V_{CC} or GND			-	±50	mA
Maximum Junction Temperature		T_J	-	150	°C
Storage Temperature		T_{STG}	−65	150	°C

Note 1. Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Note 2. The input and output negative-voltage ratings may be exceeded if the input and output clamp current ratings are observed.
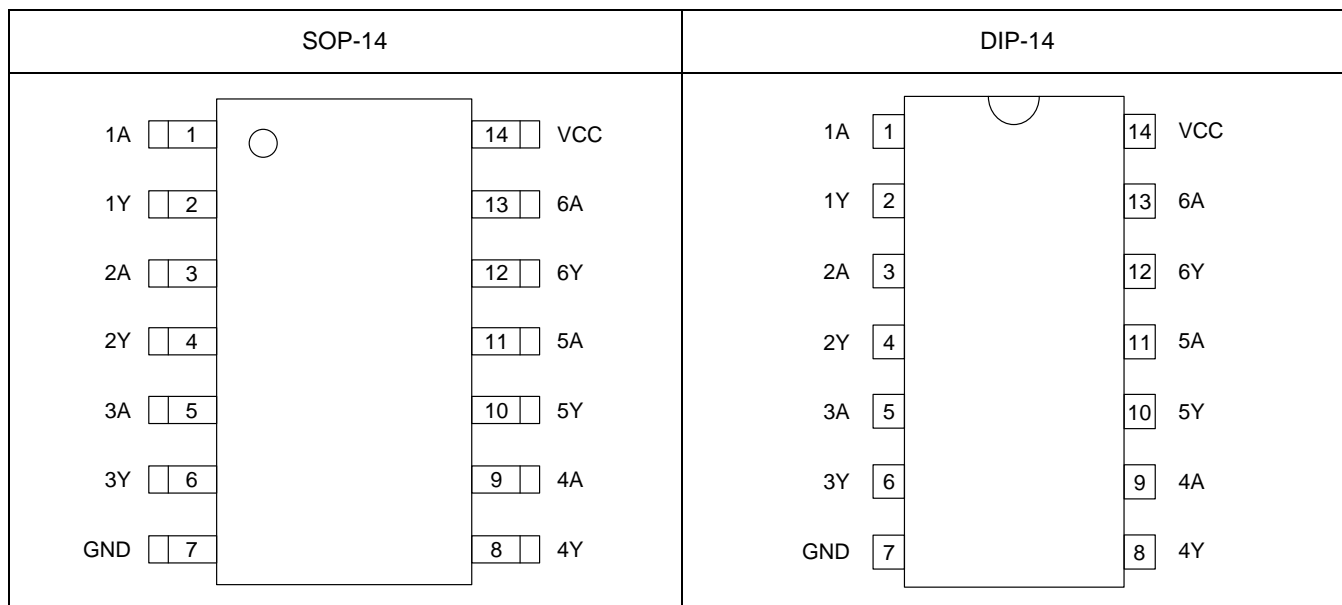
RECOMMENDED OPERATING CONDITIONS (Note 3)

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	2	6	V
DC Input Voltage	V_{IN}	0	V_{CC}	V
DC Output Voltage	V_{OUT}	0	V_{CC}	V
Operating Free-Air Temperature Range	T_A	−40	85	°C

Note 3. The device is not guaranteed to function outside its operating ratings.

ORDERING INFORMATION

Package	Order No.	Description	Supplied As	Status
SOP-14	74HC04D	Hex Inverters	Tape & Reel	Active
DIP-14	74HC04N	Hex Inverters	Tube	Active

PIN CONFIGURATION

SOP-14	DIP-14

1A	1		14	VCC	1A	1	14	VCC

<table>
<tr><td colspan="2">SOP-14</td><td colspan="2">DIP-14</td></tr>
</table>

SOP-14

1A — 1 ○ 14 — VCC
1Y — 2 13 — 6A
2A — 3 12 — 6Y
2Y — 4 11 — 5A
3A — 5 10 — 5Y
3Y — 6 9 — 4A
GND — 7 8 — 4Y

DIP-14

1A — 1 14 — VCC
1Y — 2 13 — 6A
2A — 3 12 — 6Y
2Y — 4 11 — 5A
3A — 5 10 — 5Y
3Y — 6 9 — 4A
GND — 7 8 — 4Y

PIN DESCRIPTION

Pin No.		Pin Name	Pin Function
SOP-14	DIP-14		
1	1	1A	Input 1
2	2	1Y	Output 1
3	3	2A	Input 2
4	4	2Y	Output 2
5	5	3A	Input 3
6	6	3Y	Output 3
7	7	GND	Ground
8	8	4Y	Output 4
9	9	4A	Input 4
10	10	5Y	Output 5
11	11	5A	Input 5
12	12	6Y	Output 6
13	13	6A	Input 6
14	14	VCC	Power Supply

BLOCK DIAGRAM
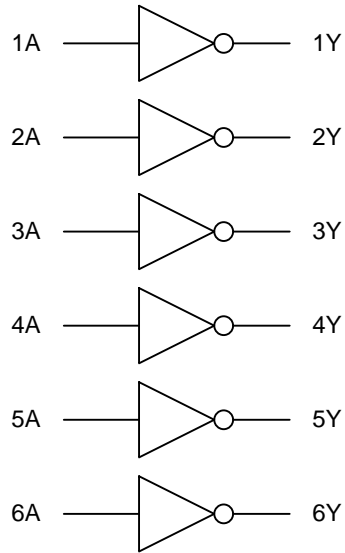
DC ELECTRICAL CHARACTERISTICS

Over operating free-air temperature range (unless otherwise noted); Voltages referenced to GND.

SYMBOL	PARAMETER	TEST CONDITION		V_{CC}	MIN	TYP	MAX	UNIT
V_{IH}	High-Level Input Voltage			2.0 V	1.5	1.2	-	V
				4.5 V	3.15	2.4	-	
				6.0 V	4.2	3.2	-	
V_{IL}	Low-Level Input Voltage			2.0 V	-	0.8	0.5	V
				4.5 V	-	2.1	1.35	
				6.0 V	-	2.8	1.8	
V_{OH}	High-Level Output Voltage	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -20\mu A$	2.0 V	1.9	2.0	-	V
				4.5 V	4.4	4.5	-	
				6.0 V	5.9	6.0	-	
			$I_{OH} = -4mA$	4.5 V	3.98	4.32	-	
			$I_{OH} = -5.2mA$	6.0 V	5.48	5.81	-	
V_{OL}	Low-Level Output Voltage	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = 20\mu A$	2.0 V	-	0	0.1	V
				4.5 V	-	0	0.1	
				6.0 V	-	0	0.1	
			$I_{OH} = 4mA$	4.5 V	-	0.15	0.26	
			$I_{OH} = 5.2mA$	6.0 V	-	0.16	0.26	
I_{IN}	Input Leakage Current	$V_{IN} = V_{CC}$ or GND		6.0 V	-	-	±0.1	µA
I_{CC}	Quiescent Supply Current	$V_{IN} = V_{CC}$ or GND, $I_O = 0A$		6.0 V	-	-	2.0	µA

AC ELECTRICAL CHARACTERISTICS

Over operating free-air temperature range (unless otherwise noted); C_L = 50 pF, Z_O = 50Ω, Input $t_r = t_f$ = 6 ns

SYMBOL	PARAMETER	V_{CC}	MIN	TYP	MAX	UNIT
t_{PLH}, t_{PHL}	Propagation Delay, Input A to Output Y (Figure 1)	2.0 V	-	25	85	ns
		4.5 V	-	9	19	
		6.0 V	-	7	14	
t_{TLH}, t_{THL}	Transition Time, Any Output (Figure 1)	2.0 V	-	19	75	ns
		4.5 V	-	7	15	
		6.0 V	-	6	13	

FUNCTION TABLE

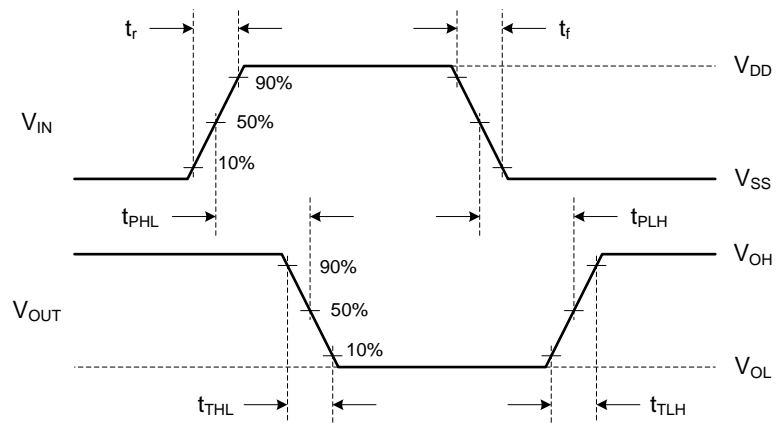| Input (A)	Output (Y)
H	L
L	H

SWITCHING WAVEFORMS

Fig. 1.

TYPICAL OPERATING CHARACTERISTICS

T.B.D.

REVISION NOTICE

The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.