

FEATURES

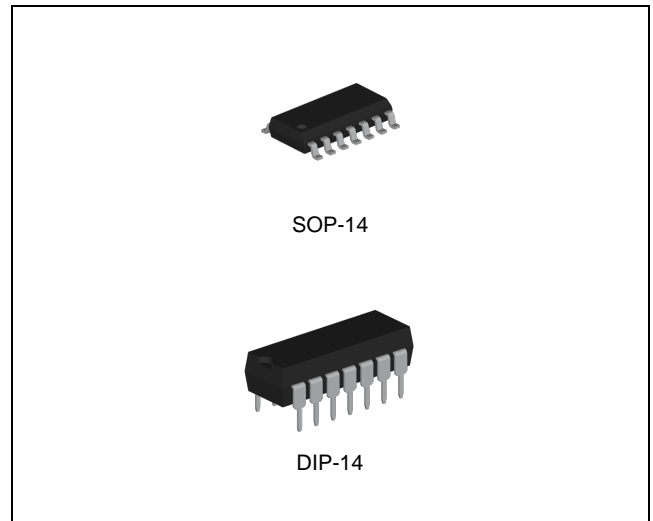
- Wide Operating Voltage Range of 2.0V to 6.0V
- Outputs Can Drive up to 10 LSTTL Loads
- Low Power Consumption, 20 μ A Maximum I_{CC}
- Typical t_{pd} : 8ns
- ± 4 mA Output Drive at 5.0V
- Low Input Current of 1 μ A Maximum

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.



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	$^{\circ}$ C
Storage Temperature		T_{STG}	-65	150	$^{\circ}$ C

Note1. 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)

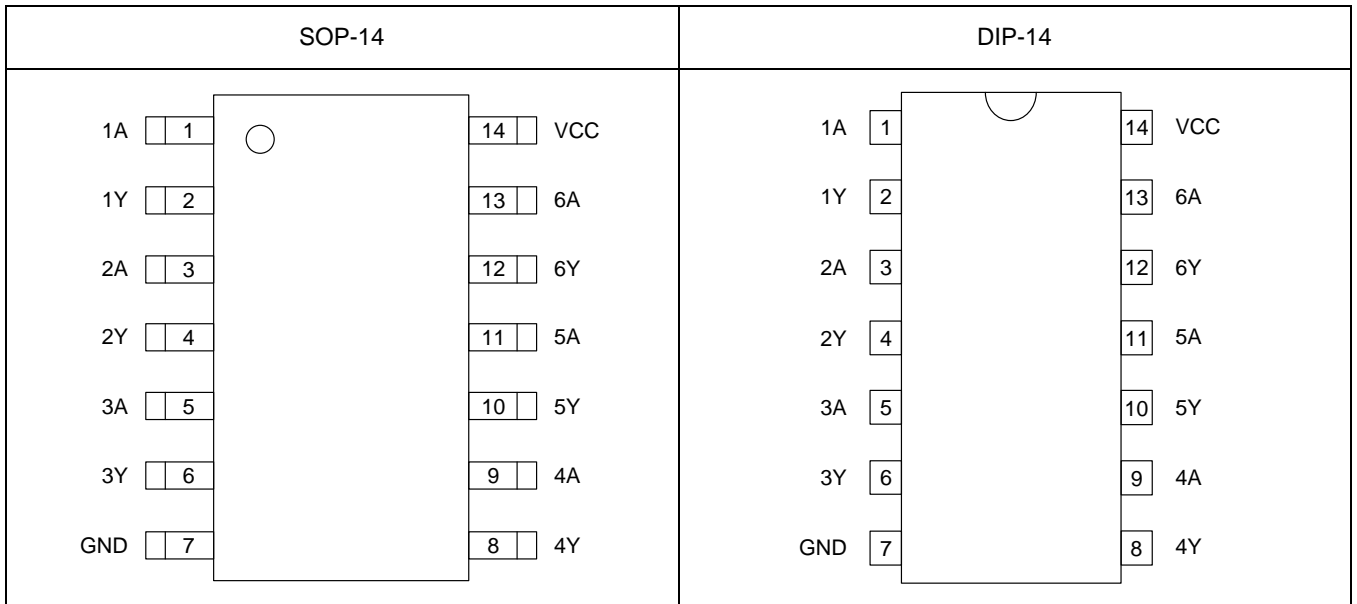
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	2	6	V
DC Input Voltage	V_{IN}	0	V_{CC}	V
DC Output Voltage	V_{OUT}	0	V_{CC}	V
Operating Free-Air Temperature Range	T_A	-40	85	°C

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

ORDERING INFORMATION

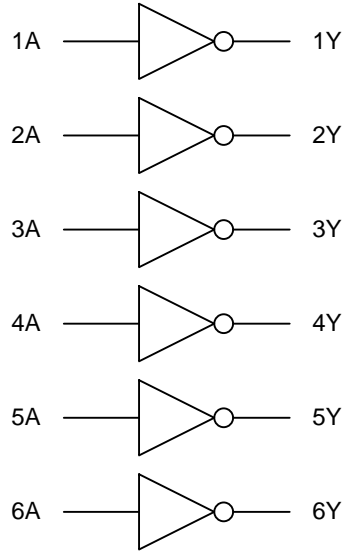
Package	Order No.	Description	Supplied As	Status
SOP-14	74HC04D	Hex Inverters	Tape & Reel	
DIP-14	74HC04N	Hex Inverters	Tube	

PIN CONFIGURATION



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} = -20μA	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	-	
				6.0 V	5.48	5.81	-	
V _{OL}	Low-Level Output Voltage	V _{IN} = V _{IH} or V _{IL}	I _{OH} = 20μA	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	
				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

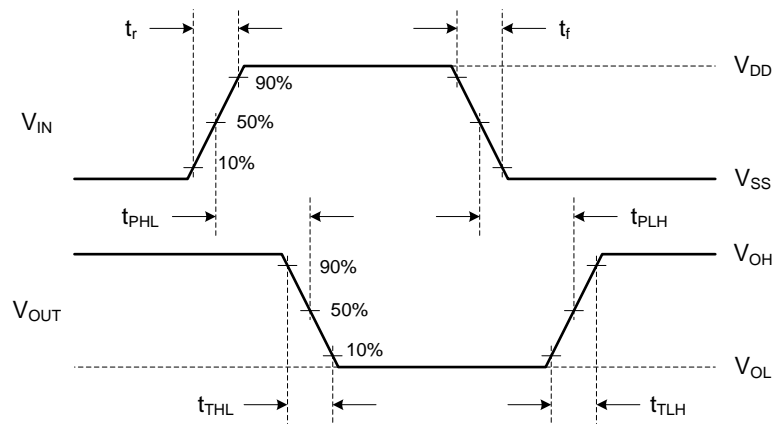


Fig. 1.