CHT 7400 DATASHEET

Revision: 3.5
8-Jul-14
(Last Modified Date)

High-Temperature Quad 2-Inputs NAND Gate

General Description

The CHT-7400 contains four independent 2-input NAND gates, performing the Boolean function :

$$Y = \overline{A \cdot B}$$

This circuit is designed assuring low leakage current and latch-up free operation for all supply and temperature conditions.

The CHT-7400 can operate with supply voltages from 3.3 to 5V (±10%).

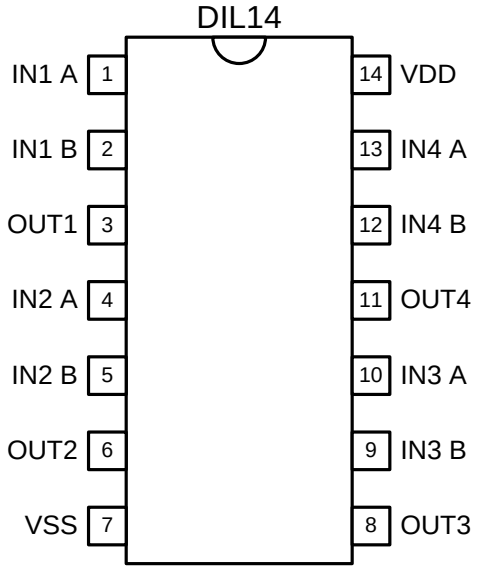
Features

- Qualified from -55 to +225°C (Tj)
- 3.3 to 5V (±10%) supply voltages
- Latchup-free at any supply and temperature condition
- Validated at 225°C for 30000 hours (CDIL14) and 20000 hours (CSOIC16) (and still on-going)
- Available in DIL14 and CSOIC16 hermetic standard package

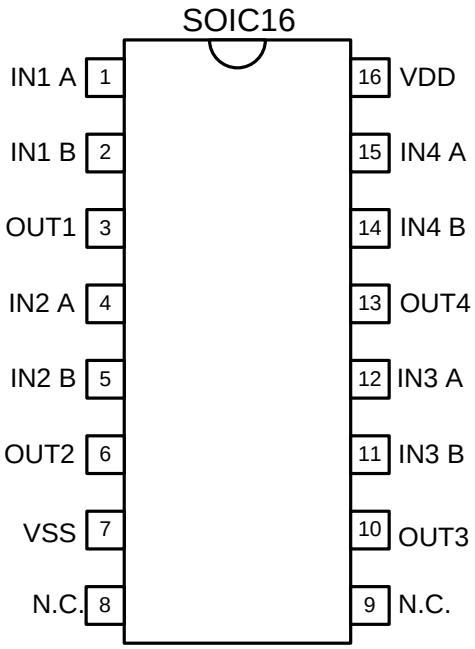
Applications

- Well logging,
- Automotive, Aeronautics & Aerospace
- Harsh Environments

Package and Pin Configuration



Pin	Symbol	Description
1	**IN1 A**	Input A of the NAND gate number 1
2	**IN1 B**	Input B of the NAND gate number 1
3	**OUT1**	Output of the NAND gate number 1
4	**IN2 A**	Input A of the NAND gate number 2
5	**IN2 B**	Input B of the NAND gate number 2
6	**OUT2**	Output of the NAND gate number 2
7	**VSS**	Circuit core ground terminal.
8	**OUT3**	Output of the NAND gate number 3
9	**IN3 B**	Input B of the NAND gate number 3
10	**IN3 A**	Input A of the NAND gate number 3
11	**OUT4**	Output of the NAND gate number 4
12	**IN4 B**	Input B of the NAND gate number 4
13	**IN4 A**	Input A of the NAND gate number 4
14	**VDD**	Circuit core power supply terminal.



Pin	Symbol	Description
1	**IN1 A**	Input A of the NAND gate number 1
2	**IN1 B**	Input B of the NAND gate number 1
3	**OUT1**	Output of the NAND gate number 1
4	**IN2 A**	Input A of the NAND gate number 2
5	**IN2 B**	Input B of the NAND gate number 2
6	**OUT2**	Output of the NAND gate number 2
7	**VSS**	Circuit core ground terminal.
8	**N.C.**	No connected terminal.
9	**N.C.**	No connected terminal.
10	**OUT3**	Output of the NAND gate number 3
11	**IN3 B**	Input B of the NAND gate number 3
12	**IN3 A**	Input A of the NAND gate number 3
13	**OUT4**	Output of the NAND gate number 4
14	**IN4 B**	Input B of the NAND gate number 4
15	**IN4 A**	Input A of the NAND gate number 4
16	**VDD**	Circuit core power supply terminal.

Function Table

INPUT		OUTPUT
A	**B**	**Y**
L	**L**	**H**
L	**H**	**H**
H	**L**	**H**
H	**H**	**L**

Function and Logical Diagrams

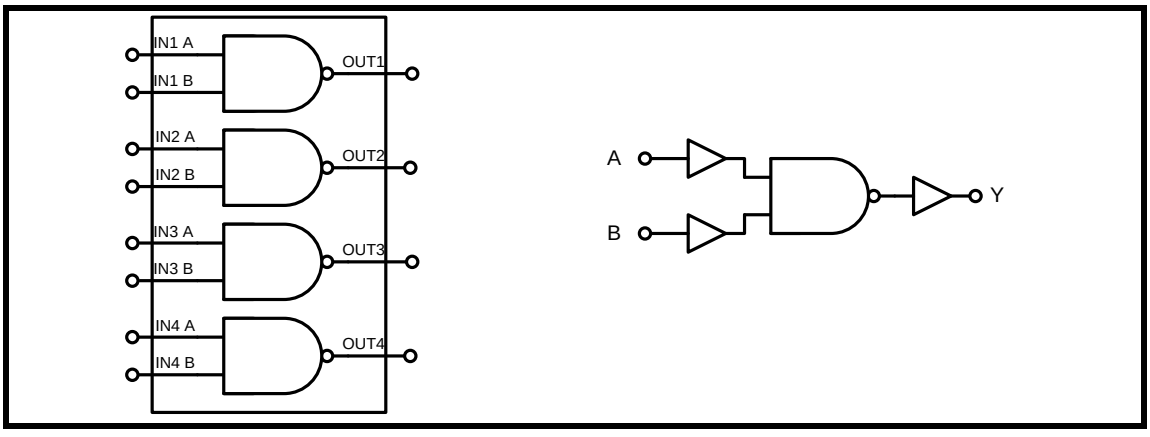


Figure 1. CHT-7400: simplified block diagram

Absolute Maximum Ratings

Supply Voltage V_{DD} to GND	-0.7 to 6.0V
Voltage on any Pin to GND	-0.5 to V_{DD}+0.5V

ESD Rating (expected)

Human Body Model	1kV

Operating Conditions

Supply Voltage V_{DD} to GND	3.3V to 5V (±10%)
Junction temperature	-55°C to +225°C

DC Electrical Characteristics

Unless otherwise stated: VDD=5V, T_j=25°C. **Bold underlined** figures indicate values valid over the whole temperature range (-55°C < T_j < +225°C).

Parameter	Condition	Min	Typ	Max	Units
Supply voltage **V_{DD}**		2.97		5.5V	V
Quiescent current **I_{DD}**	V_{DD} = 3.3V, T_j=-55°C			4	nA
	V_{DD} = 5V, T_j=-55°C			13	
	V_{DD} = 3.3V, T_j=225°C			**1980**	
	V_{DD} = 5V, T_j=225°C			**2230**	
Minimum HIGH level output voltage **V_{OH}**	V_{DD} = 3.3V, I_{OH}<4mA (source)	**2.7**	3.04		V
	V_{DD} = 5V, I_{OH}<4mA (source)	**4.6**	4.82		
Maximum LOW level output voltage **V_{OL}**	V_{DD} = 3.3V, I_{OL}<4mA (sink)		0.28	**0.5**	V
	V_{DD} = 5V, I_{OL}<4mA (sink)		0.20	**0.4**	
Minimum HIGH level input voltage **V_{IH}**	V_{DD} = 3.3V	**2.4**	2.10		V
	V_{DD} = 5V	**3.7**	3.49		
Maximum LOW level input voltage **V_{IL}**	V_{DD} = 3.3V		1.72	**1.5**	V
	V_{DD} = 5V		2.16	**2.0**	
Input leakage current (source / sink) **± I_I**	VI=VCC or GND, V_{DD} = 3.3V		±1	**±35**	nA
	VI=VCC or GND, V_{DD} = 5V		±2	**±37**	

AC Electrical Characteristics

Unless otherwise stated: VDD=5V, T_j=25°C. **Bold underlined** figures indicate values valid over the whole temperature range (-55°C < T_j < +225°C).

Parameter	Condition	Temperature	Min	Typ	Max	Units
Propagation delay time from A or B to Y t_{PHL}	C_L=50pF	T_j=-55°C		9	16	ns
		T_j=25°C		10	18	
		T_j=225°C		14	25	
Propagation delay time from A or B to Y t_{PLH}	C_L=50pF	T_j=-55°C		9	16	ns
		T_j=25°C		10	18	
		T_j=225°C		13	23	
Output transition time High to Low t_{THL}	C_L=50pF	T_j=-55°C		13	17	ns
		T_j=25°C		14	18	
		T_j=225°C		17	**22**	
Output transition time Low to High t_{TLH}	C_L=50pF	T_j=-55°C		19	25	ns
		T_j=25°C		20	26	
		T_j=225°C		23	**30**	

AC Electrical Characteristics (cntd)

Unless otherwise stated: VDD=3.3V, T_j=25°C. **Bold underlined** figures indicate values valid over the whole temperature range (-55°C < T_j < +225°C).

Parameter	Condition	Temperature	Min	Typ	Max	Units
Propagation delay time from A or B to Y t_{PHL}	C_L=50pF	T_j=-55°C		14	25	ns
		T_j=25°C		17	30	
		T_j=225°C		24	42	
Propagation delay time from A or B to Y t_{PLH}	C_L=50pF	T_j=-55°C		13	23	ns
		T_j=25°C		16	28	
		T_j=225°C		22	38	
Output transition time High to Low t_{THL}	C_L=50pF	T_j=-55°C		20	26	ns
		T_j=25°C		21	28	
		T_j=225°C		27	**36**	
Output transition time High to Low t_{TLH}	C_L=50pF	T_j=-55°C		23	30	ns
		T_j=25°C		24	32	
		T_j=225°C		26	**34**	

AC Waveforms

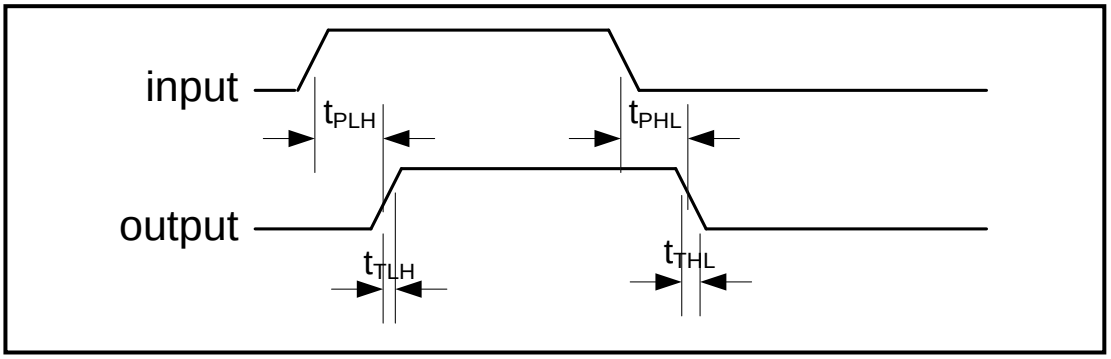
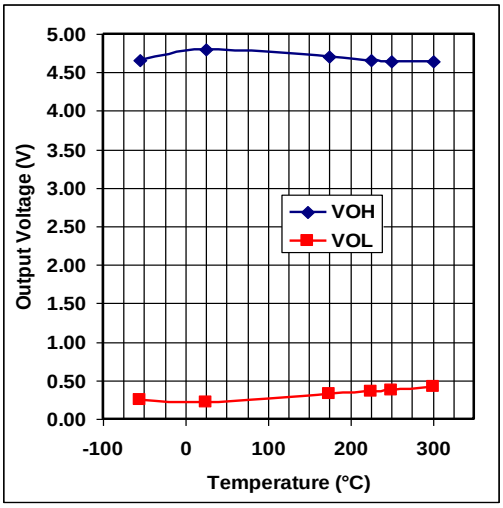
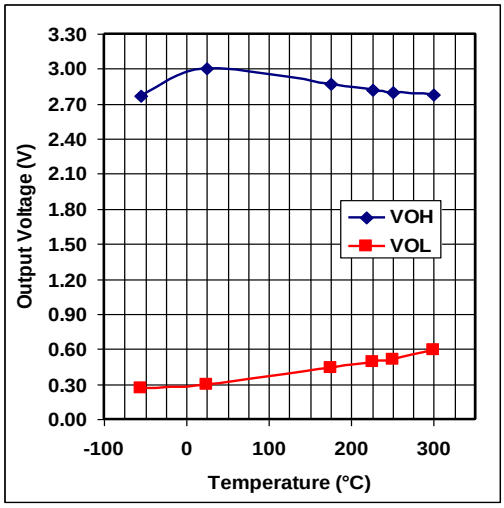


Figure 2. AC Waveforms

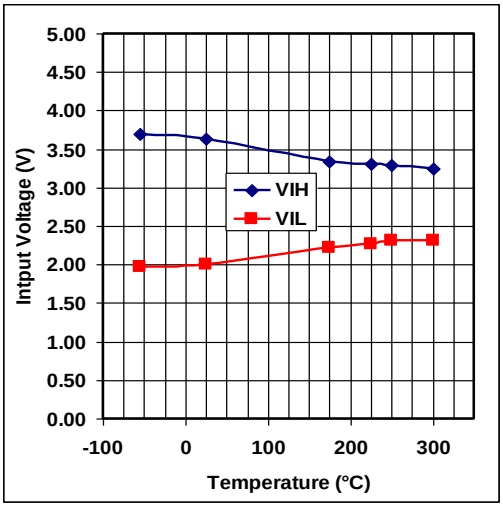
Typical Performance Characteristics



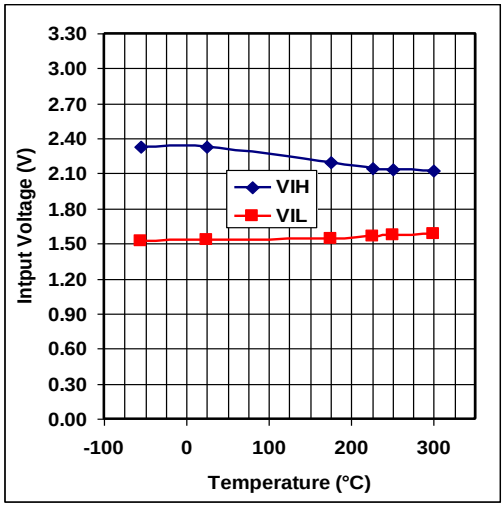
Output voltage levels versus temperature, V_{DD} = 5V



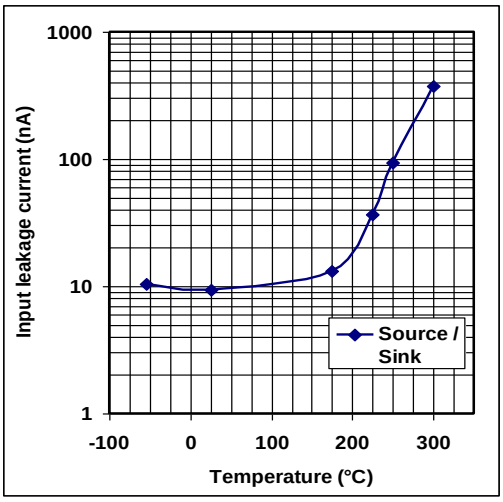
Output voltage levels versus temperature, V_{DD} = 3.3V



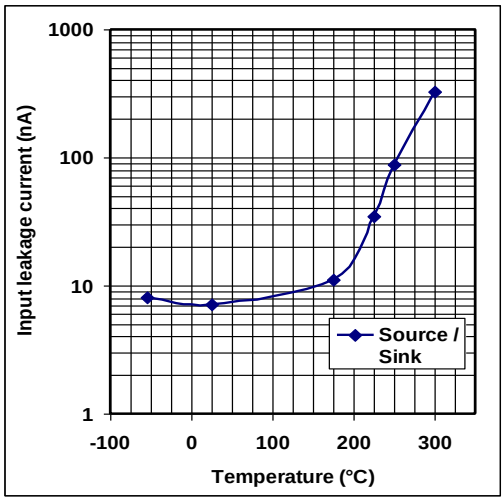
Input voltage levels versus temperature, V_{DD} = 5V



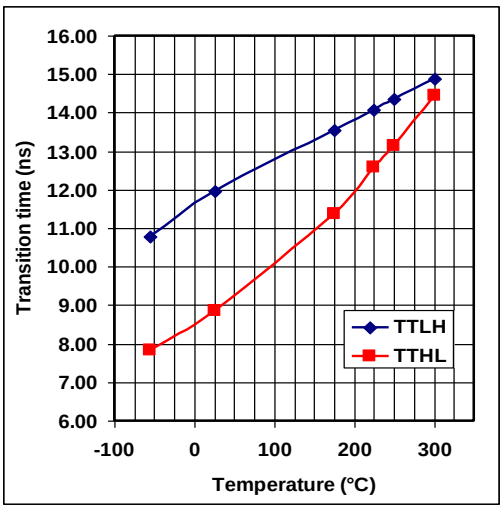
Input voltage levels versus temperature, V_{DD} = 3.3V



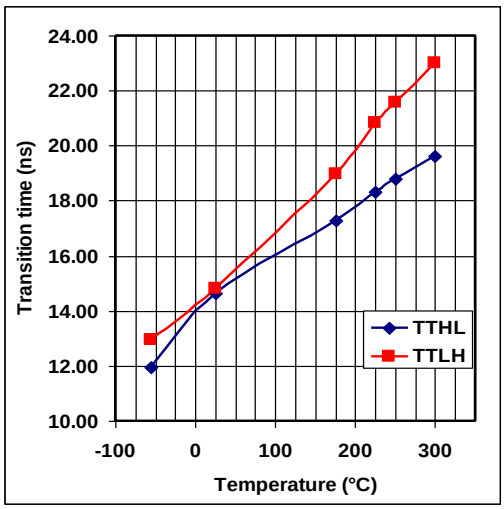
Input leakage current versus temperature, V_{DD} = 5V



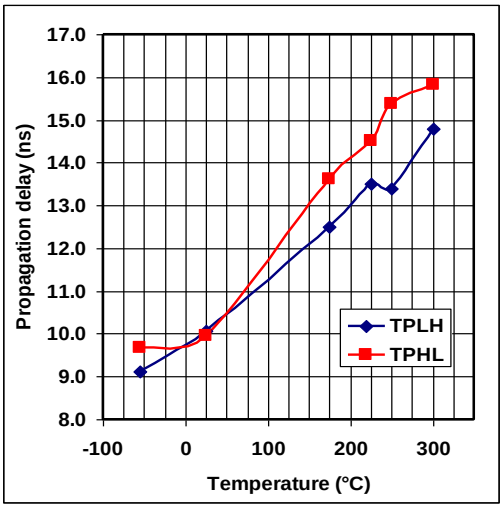
Input leakage current versus temperature, V_{DD} = 3.3V



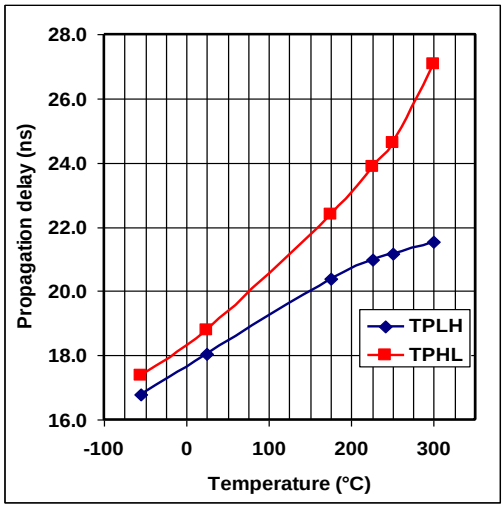
Transition times versus temperature, V_{DD} = 5V



Transition times versus temperature, V_{DD} = 3.3V



Propagation delays versus temperature, V_{DD} = 5V

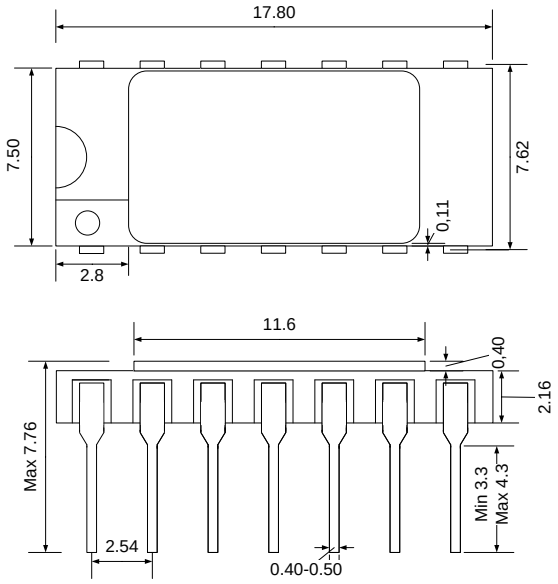


Propagation delays versus temperature, V_{DD} = 3.3V

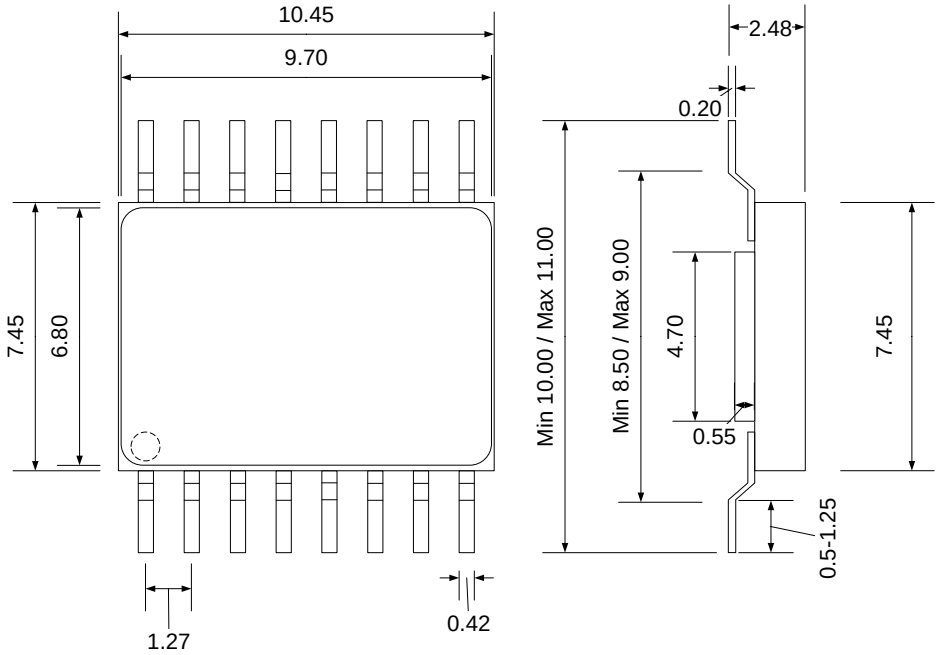
Ordering Information

Ordering Reference	Package	Temperature Range	Marking
CHT-7400-CDIL14-T	Ceramic DIL14	-55°C to +225°C	CHT-7400
CHT-7400-CSOIC16-T	Ceramic SOIC 16	-55°C to +225°C	CHT-7400

Package Dimensions



Drawing CDIL14 (mm +/- 10%)



Drawing CSOIC16 (mm +/- 10%)

Contact & Ordering

CISSOID S.A.

Headquarters and contact EMEA:	CISSOID S.A. – Rue Francqui, 3 – 1435 Mont Saint Guibert - Belgium T : +32 10 48 92 10 - F: +32 10 88 98 75 Email: sales@cissoid.com
Representatives	Visit our website : www.cissoid.com

Disclaimer

Neither CISSOID, nor any of its directors, employees or affiliates make any representations or extend any warranties of any kind, either express or implied, including but not limited to warranties of merchantability, fitness for a particular purpose, and the absence of latent or other defects, whether or not discoverable. In no event shall CISSOID, its directors, employees and affiliates be liable for direct, indirect, special, incidental or consequential damages of any kind arising out of the use of its circuits and their documentation, even if they have been advised of the possibility of such a damage. The circuits are provided "as is". CISSOID has no obligation to provide maintenance, support, updates, or modifications.