

CHT-7404 DATASHEET

*Revision: 03.5
15-Feb-21
(Last Modified Date)*

High-Temperature, Hex Inverter

General Description

The CHT-7404 contains six independent inverter, performing the Boolean function :

$$Y = \overline{A}$$

This circuit is designed assuring latchup-free operation for all supply and temperature conditions.

The CHT-7404 can operate with supply voltages from 3.3 to 5V ($\pm 10\%$).

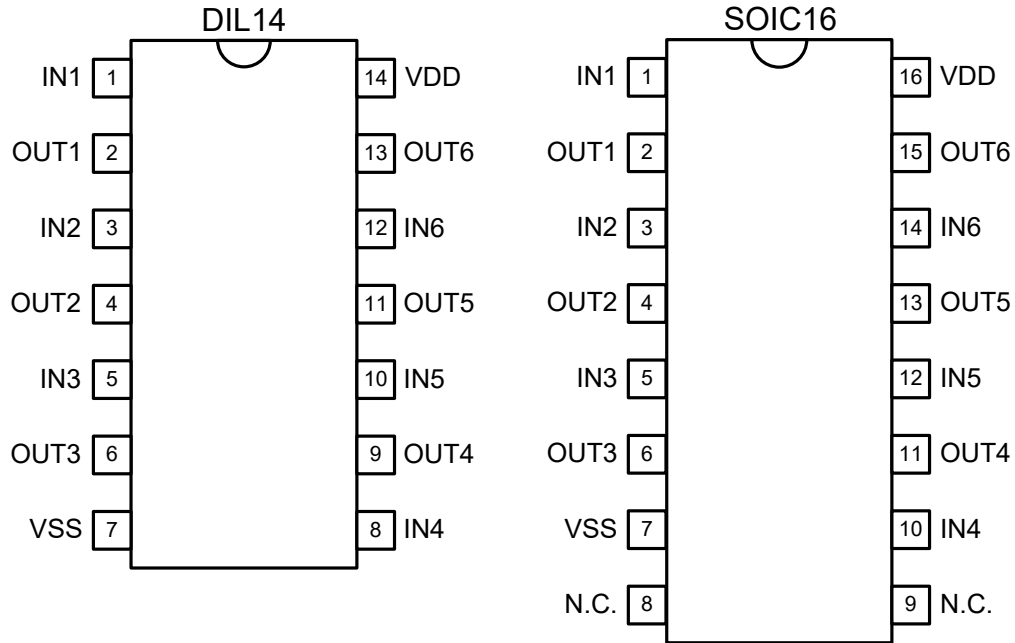
Features

- Qualified from -55 to +225°C (Tj)
- 3.3 to 5V ($\pm 10\%$) 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 CDIL14 and CSOIC16 hermetic standard package

Applications

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

Package and Pin Configuration



Function Table

INPUT	OUTPUT
A	Y
L	H
H	L

Function and Logical Diagrams

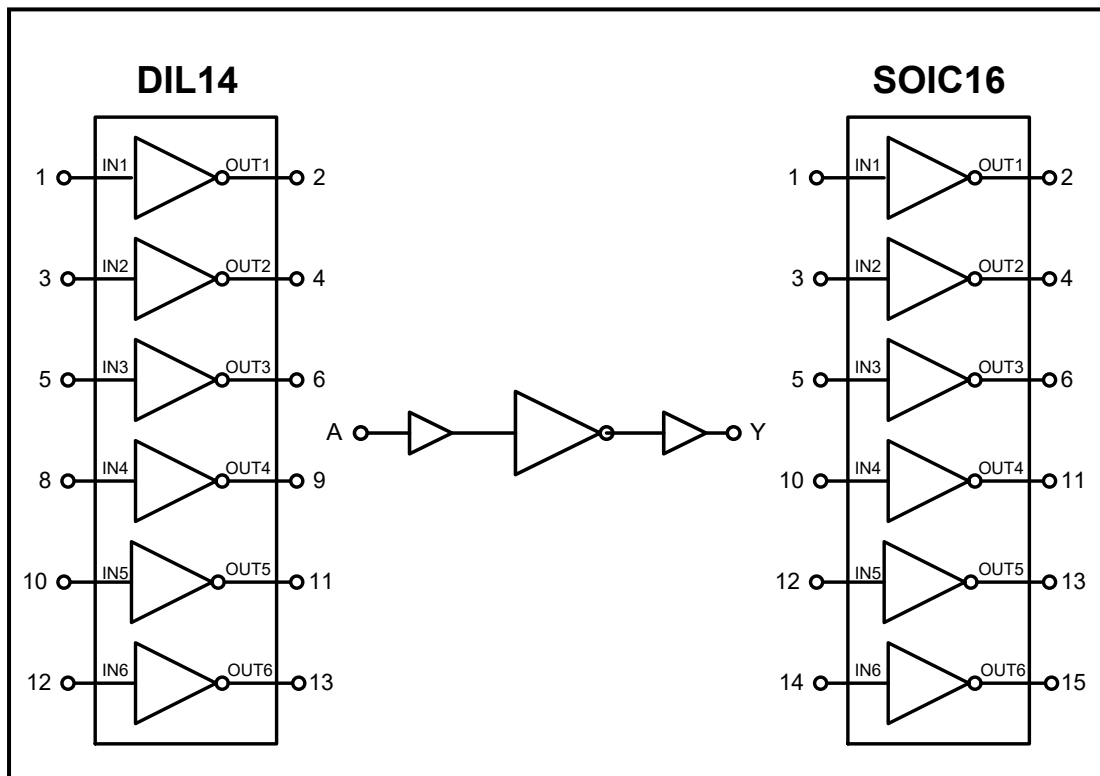


Figure 1. CHT-7404: simplified block diagram.

Absolute Maximum Ratings

 Supply Voltage V_{DD} to GND -0.5 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 ($\pm 10\%$)
 Junction temperature -55°C to +225°C

DC Electrical Characteristics

 Unless otherwise stated: $V_{DD}=5V$, $T_j=25^\circ C$. **Bold underlined** figures indicate values valid over the whole temperature range ($-55^\circ C < T_j < +225^\circ C$).

Parameter	Condition	Min	Typ	Max	Units
Supply voltage V_{DD}		2.97		5.5V	V
Quiescent current I_{DD}	$V_{DD} = 3.3V, T_j = -55^\circ C$			4	nA
	$V_{DD} = 5V, T_j = -55^\circ C$			13	
	$V_{DD} = 3.3V, T_j = 225^\circ C$			<u>2100</u>	
	$V_{DD} = 5V, T_j = 225^\circ C$			<u>2500</u>	
Minimum HIGH level output voltage V_{OH}	$V_{DD} = 3.3V, I_{OH} < 4mA$ (source)	<u>2.7</u>	3.04		V
	$V_{DD} = 5V, I_{OH} < 4mA$ (source)	<u>4.6</u>	4.82		
Maximum LOW level output voltage V_{OL}	$V_{DD} = 3.3V, I_{OL} < 4mA$ (sink)		0.28	<u>0.5</u>	V
	$V_{DD} = 5V, I_{OL} < 4mA$ (sink)		0.20	<u>0.4</u>	
Minimum HIGH level input voltage V_{IH}	$V_{DD} = 3.3V$	<u>2.4</u>	2.10		V
	$V_{DD} = 5V$	<u>3.7</u>	3.49		
Maximum LOW level input voltage V_{IL}	$V_{DD} = 3.3V$		1.72	<u>1.5</u>	V
	$V_{DD} = 5V$		2.16	<u>2.0</u>	
Input leakage current (source / sink) $\pm I_I$	$V_I = V_{CC}$ or GND, $V_{DD} = 3.3V$		± 1	<u>± 35</u>	nA
	$V_I = V_{CC}$ or GND, $V_{DD} = 5V$		± 2	<u>± 37</u>	

AC Electrical Characteristics

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

Parameter	Condition	Temperature	Min	Typ	Max	Units
Propagation delay time from A to Y t_{PHL}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		9	16	ns
		$T_j=25^\circ\text{C}$		10	18	
		$T_j=225^\circ\text{C}$		14	25	
Propagation delay time from A to Y t_{PLH}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		11	20	ns
		$T_j=25^\circ\text{C}$		12	21	
		$T_j=225^\circ\text{C}$		13	23	
Output transition time High to Low t_{THL}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		13	17	ns
		$T_j=25^\circ\text{C}$		14	18	
		$T_j=225^\circ\text{C}$		17	<u>22</u>	
Output transition time Low to High t_{TLH}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		19	25	ns
		$T_j=25^\circ\text{C}$		20	26	
		$T_j=225^\circ\text{C}$		23	<u>30</u>	

AC Electrical Characteristics (cntd)

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

Parameter	Condition	Temperature	Min	Typ	Max	Units
Propagation delay time from A or B to Y t_{PHL}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		16	28	ns
		$T_j=25^\circ\text{C}$		17	30	
		$T_j=225^\circ\text{C}$		23	40	
Propagation delay time from A or B to Y t_{PLH}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		17	30	ns
		$T_j=25^\circ\text{C}$		18	32	
		$T_j=225^\circ\text{C}$		21	37	
Output transition time High to Low t_{THL}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		20	26	ns
		$T_j=25^\circ\text{C}$		21	28	
		$T_j=225^\circ\text{C}$		27	<u>36</u>	
Output transition time Low to High t_{TLH}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		23	30	ns
		$T_j=25^\circ\text{C}$		24	32	
		$T_j=225^\circ\text{C}$		26	<u>34</u>	

AC Waveforms

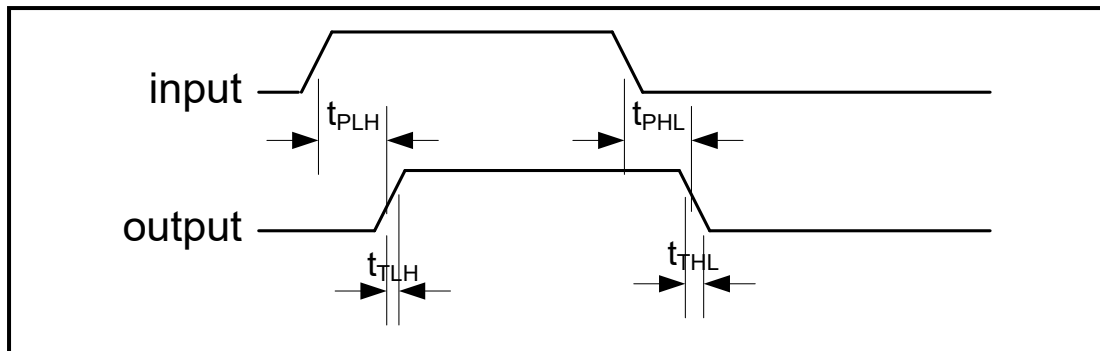
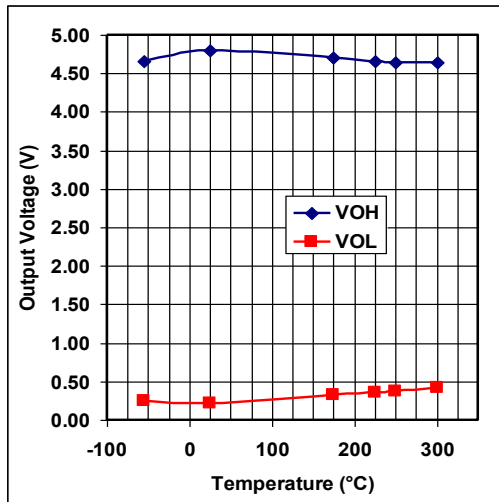
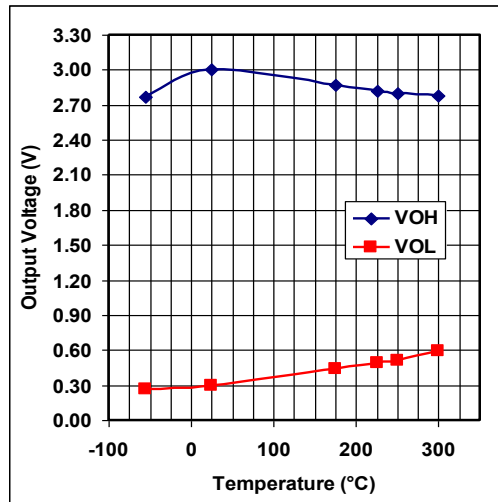


Figure 2. AC Waveforms

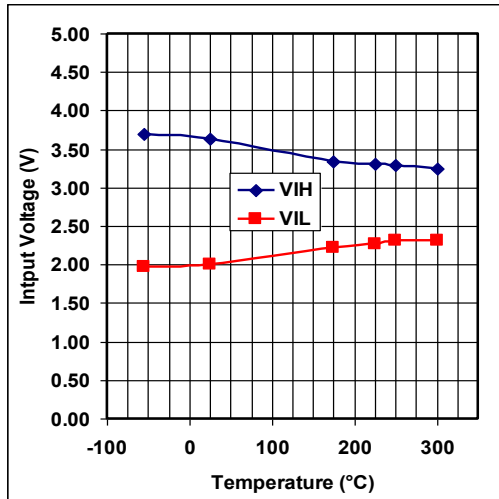
Typical Performance Characteristics



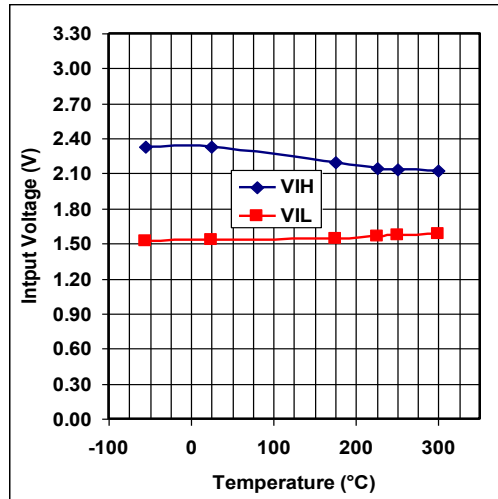
Output voltage levels versus temperature, $V_{DD} = 5V$



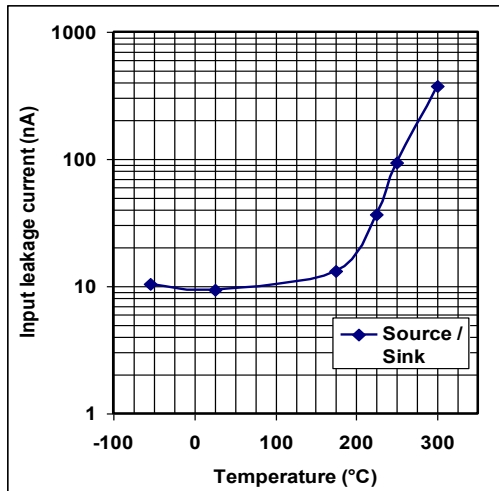
Output voltage levels versus temperature, $V_{DD} = 3.3V$



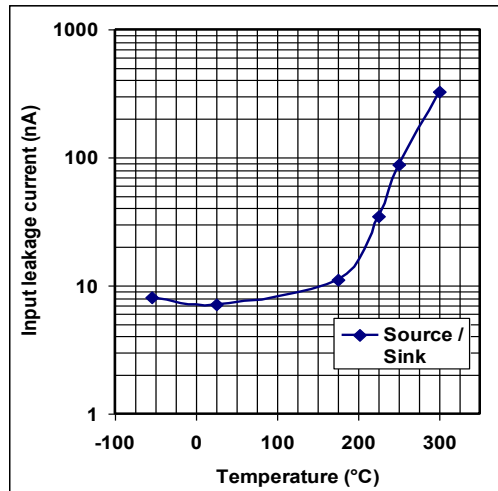
Input voltage levels versus temperature, $V_{DD} = 5V$



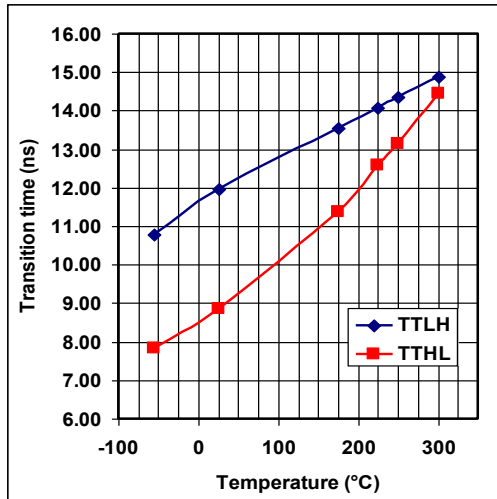
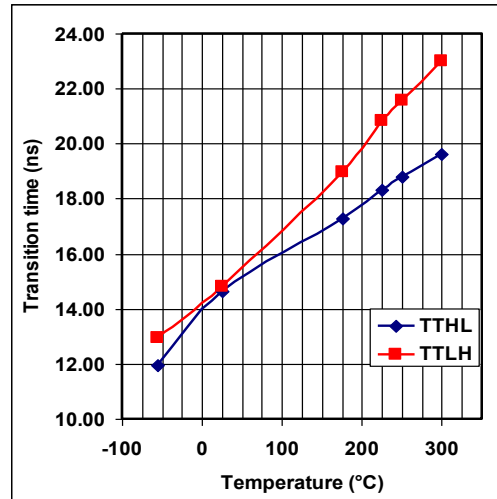
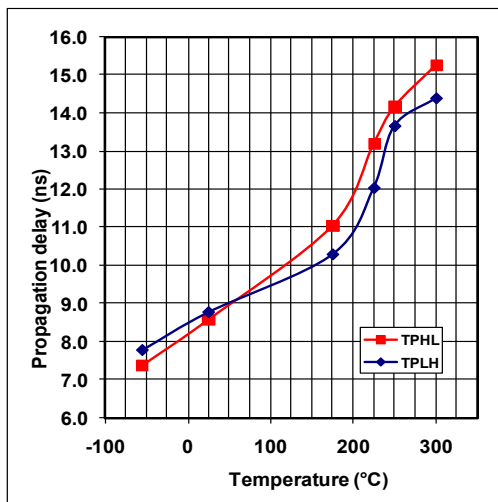
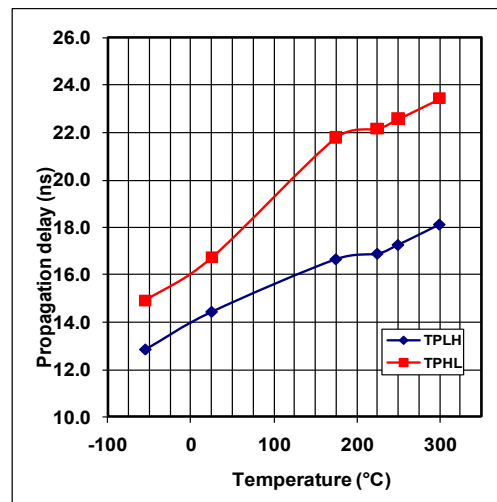
Input voltage levels versus temperature, $V_{DD} = 3.3V$



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



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

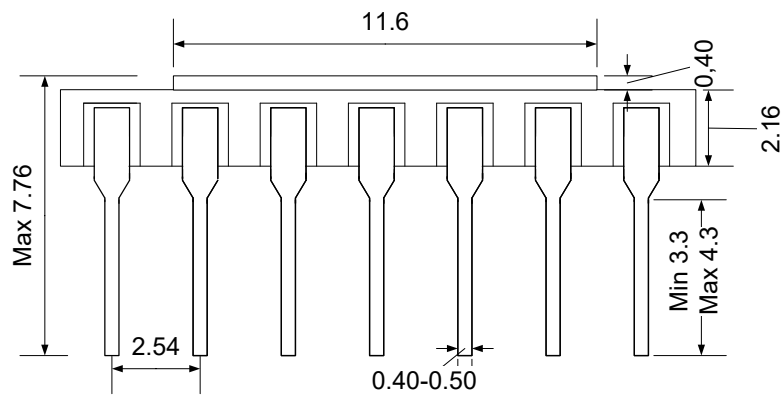
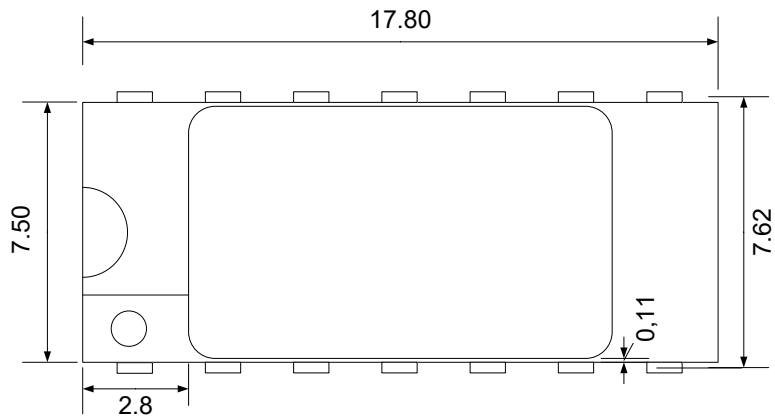

 Transition times versus temperature,
 $V_{DD} = 5V$

 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

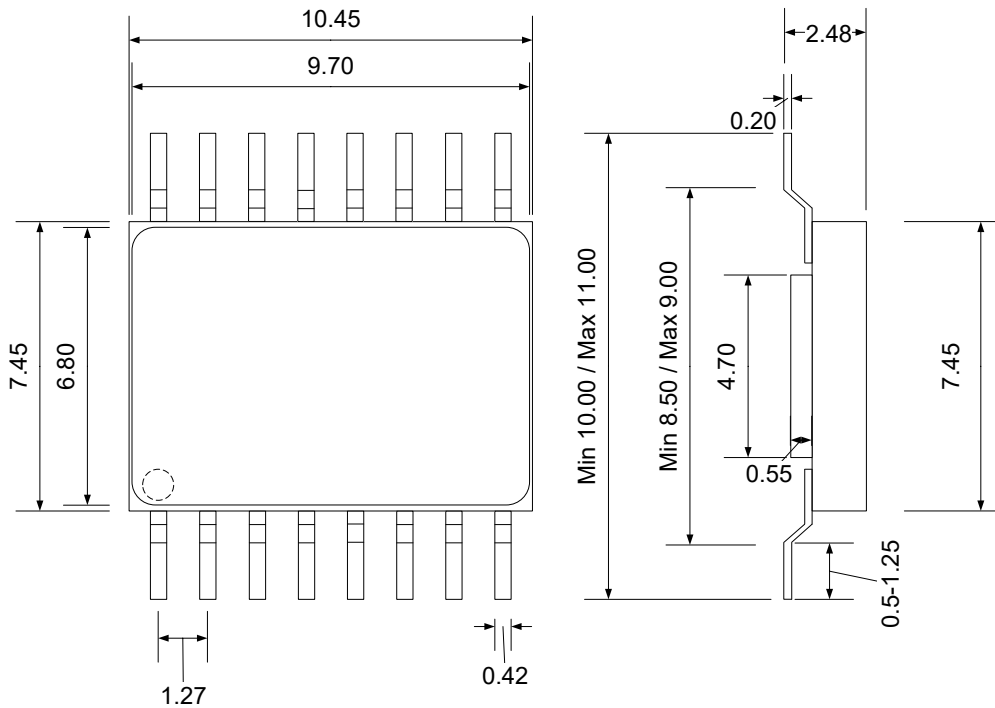
Ordering Reference	Package	Temperature Range	Marking	Status
CHT-7404-CDIL14-T	Ceramic DIL14	-55°C to +225°C	CHT-7404	Not for new design
CHT-7404-CSOIC16-T	Ceramic CSOIC16	-55°C to +225°C	CHT-7404	Active



Package Dimensions



Drawing CDIL14 (mm +/- 10%)



Drawing CSOIC16 (mm +/- 10%)

Contact & Ordering

CISSOID S.A.

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