

CMT-7404 DATASHEET

Revision: 1.5
10-Dec-23
(Last Modified Date)

High-Temperature, Hex Inverter

General Description

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

$$Y = \overline{A}$$

This circuit is fabricated using a CMOS SOI process, assuring latchup-free operation for all supply and temperature conditions.

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

The CMT-7404 uses internal metal lines presenting extremely high immunity to electromigration, improving product lifetime by a factor of 10, compared to the case where aluminum metallization is used.

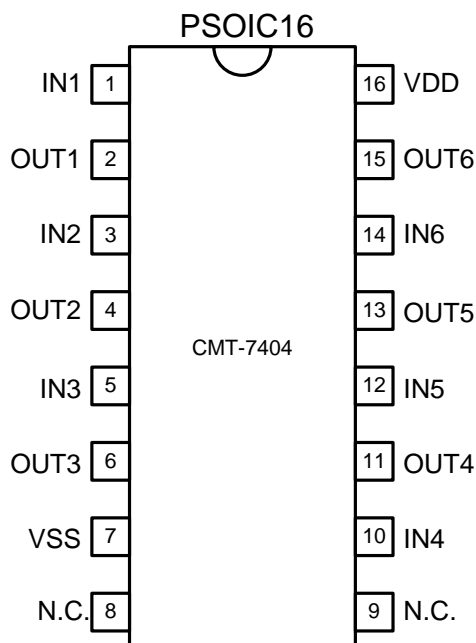
Features

- Qualified from -55 to +175°C (Tj)
- 3.3 to 5V ($\pm 10\%$) supply voltages
- Latchup-free at any supply and temperature condition
- Validated at 175°C for 20000 hours (and still on-going)
- Available in plastic SOIC16 standard package
- Improved internal metallization for extended reliability

Applications

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

Package and Pin Configuration



Pin	Symbol	Description
1	IN1	Input of inverter number 1
2	OUT1	Output of inverter number 1
3	IN2	Input of inverter number 2
4	OUT2	Output of inverter number 2
5	IN3	Input of inverter number 3
6	OUT3	Output of inverter number 3
7	GND	Circuit core ground terminal.
8	N.C.	No connected terminal
9	N.C.	No connected terminal
10	IN4	Input of inverter number 4
11	OUT4	Output of inverter number 4
12	IN5	Input of inverter number 5
13	OUT5	Output of inverter number 5
14	IN6	Input of inverter number 6
15	OUT6	Output of inverter number 6
16	VDD	Circuit core power supply terminal.

Function Table

INPUT	OUTPUT
A	Y
L	H
H	L

Function and Logical Diagrams

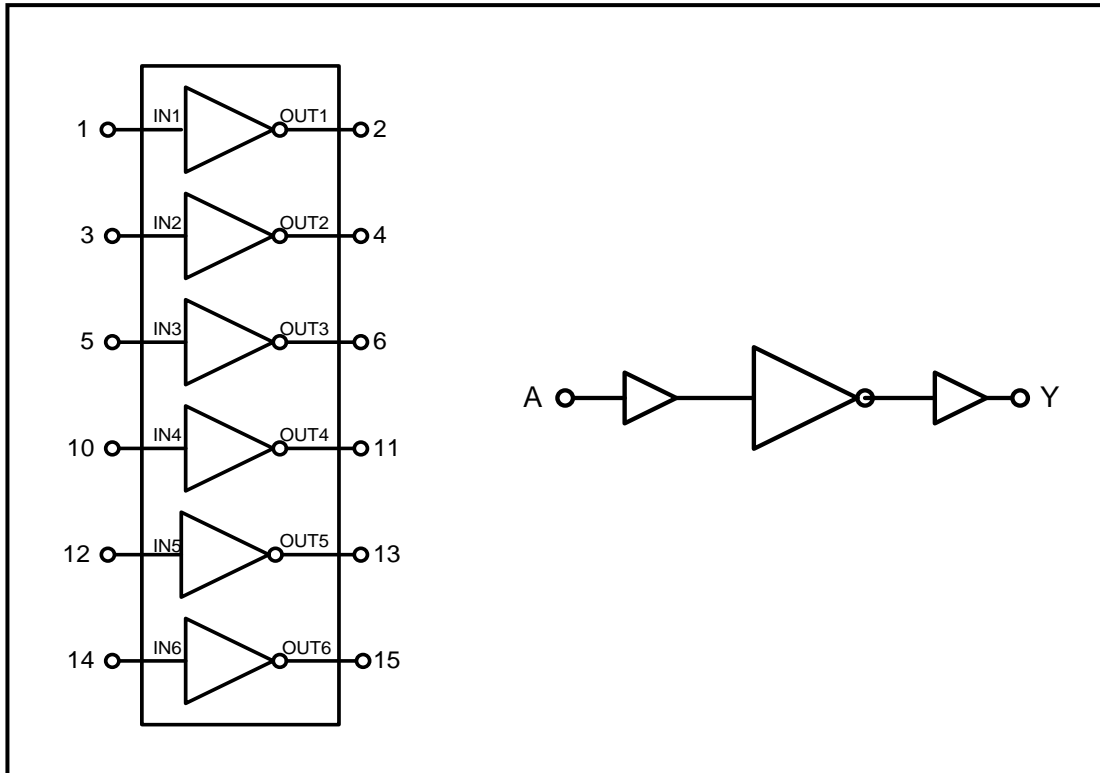


Figure 1. CMT-7404: simplified block diagram.

Absolute Maximum Ratings

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

Operating Conditions

Supply Voltage V_{DD} to GND 3.3V to 5V ($\pm 10\%$)
Junction temperature -55°C to +175°C

ESD Rating (expected)

Human Body Model 1kV

DC Electrical Characteristics

Unless otherwise stated: $T_j=25^\circ\text{C}$. **Bold underlined** figures indicate values valid over the whole temperature range ($-55^\circ\text{C} < T_j < +175^\circ\text{C}$).

Parameter	Condition	Min	Typ	Max	Units
Supply voltage V_{DD}		3.3	5V		V
Quiescent current I_{DD}	$V_{DD} = 3.3V, T_j = -55^\circ\text{C}$			4	nA
	$V_{DD} = 5V, T_j = -55^\circ\text{C}$			6	
	$V_{DD} = 3.3V, T_j = 175^\circ\text{C}$			<u>928</u>	
	$V_{DD} = 5V, T_j = 175^\circ\text{C}$			<u>229</u>	
Minimum HIGH level output voltage V_{OH}	$V_{DD} = 3.3V, I_{OH} < 2\text{mA}$ (source)	<u>2.46</u>			V
	$V_{DD} = 5V, I_{OH} < 4\text{mA}$ (source)	<u>4.47</u>			
Maximum LOW level output voltage V_{OL}	$V_{DD} = 3.3V, I_{OL} < 2\text{mA}$ (sink)			<u>0.41</u>	V
	$V_{DD} = 5V, I_{OL} < 4\text{mA}$ (sink)			<u>0.59</u>	
Minimum HIGH level input voltage V_{IH}	$V_{DD} = 3.3V$	<u>2.2</u>			V
	$V_{DD} = 5V$	<u>3.3</u>			
Maximum LOW level input voltage V_{IL}	$V_{DD} = 3.3V$			<u>1.5</u>	V
	$V_{DD} = 5V$			<u>2.2</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 ($-55^\circ\text{C} < T_j < +175^\circ\text{C}$).

Parameter	Condition	Temperature	Min	Typ	Max	Units
Propagation delay time from A to Y t_{PHL}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		7.2	9.5	ns
		$T_j=25^\circ\text{C}$		8.7	11.9	
		$T_j=175^\circ\text{C}$		12	17	
Propagation delay time from A to Y t_{PLH}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		6.3	8.8	ns
		$T_j=25^\circ\text{C}$		7.9	11.2	
		$T_j=175^\circ\text{C}$		10.8	15.8	
Output transition time High to Low t_{THL}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		6.6	8.4	ns
		$T_j=25^\circ\text{C}$		8.1	10.7	
		$T_j=175^\circ\text{C}$		11.8	16	
Output transition time Low to High t_{TLH}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		5.2	7.5	ns
		$T_j=25^\circ\text{C}$		6.9	9.9	
		$T_j=175^\circ\text{C}$		9.8	13.8	

AC Electrical Characteristics (cntd)

Unless otherwise stated: $V_{DD}=3.3V$, $T_j=25^\circ C$. **Bold underlined** figures indicate values valid over the whole temperature range ($-55^\circ C < T_j < +175^\circ C$).

Parameter	Condition	Temperature	Min	Typ	Max	Units
Propagation delay time from A or B to Y t_{PHL}	$C_L=50pF$	$T_j=-55^\circ C$		14	22.1	ns
		$T_j=25^\circ C$		16.5	26.6	
		$T_j=175^\circ C$		21.5	34.4	
Propagation delay time from A or B to Y t_{PLH}	$C_L=50pF$	$T_j=-55^\circ C$		12.3	20.1	ns
		$T_j=25^\circ C$		15	24.4	
		$T_j=175^\circ C$		19.4	31.2	
Output transition time High to Low t_{THL}	$C_L=50pF$	$T_j=-55^\circ C$		10.7	17	ns
		$T_j=25^\circ C$		13	21.5	
		$T_j=175^\circ C$		18	29.5	
Output transition time Low to High t_{TLH}	$C_L=50pF$	$T_j=-55^\circ C$		8	14.3	ns
		$T_j=25^\circ C$		10.2	16.8	
		$T_j=175^\circ C$		13.5	21	

AC Waveforms

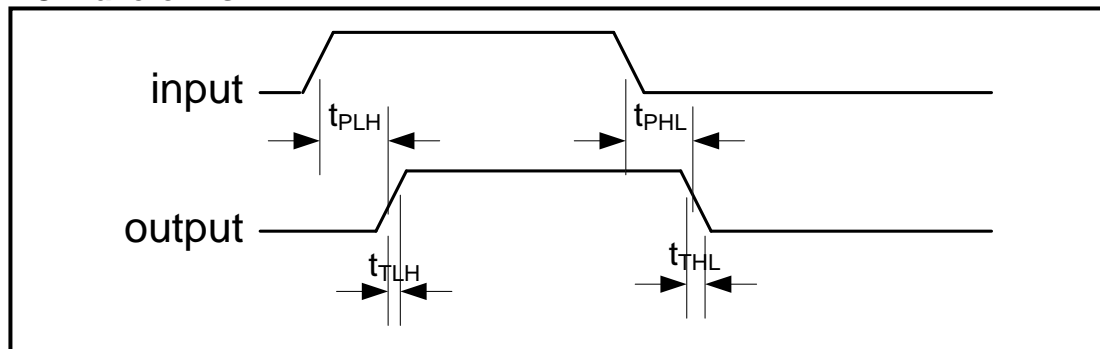
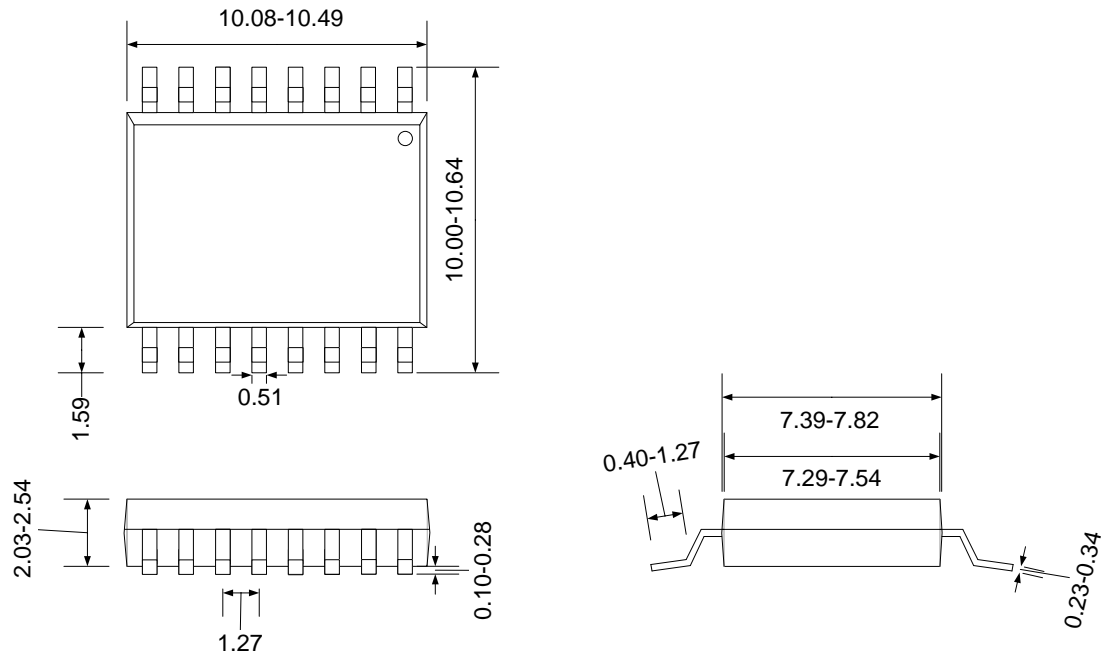


Figure 2. AC Waveforms

Ordering Information

Ordering Reference	Package	Temperature Range	Marking
CMT-7404-PSOIC16-T	Plastic SOIC16	-55°C to +175°C	CMT-7404

Package Dimensions



Drawing PSOIC16 (mm)

Contact & Ordering

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