

CMT-74021 DATASHEET

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

High-Temperature, Quad 2-Inputs NOR Gate

General Description

The CMT-74021 contains four independent 2-inputs NOR gates, performing the Boolean function :

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

The CMT-74021 can operate with supply voltages from 3.3 to 5V ($\pm 10\%$).

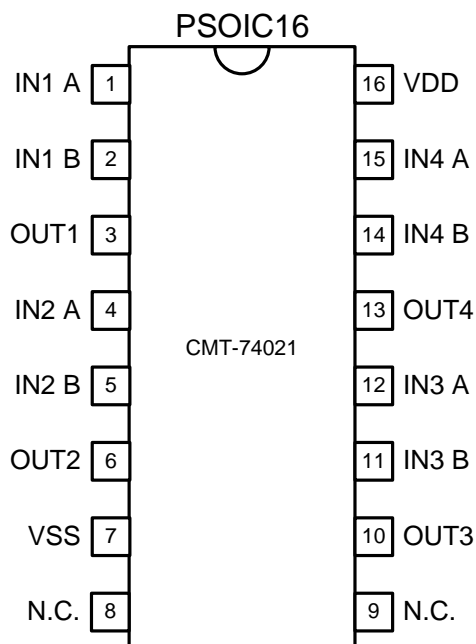
Features

- 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

Applications

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

Package and Pin Configuration



Pin	Symbol	Description
1	IN1 A	Input A of the NOR gate number 1
2	IN1 B	Input B of the NOR gate number 1
3	OUT1	Output of the NOR gate number 1
4	IN2 A	Input A of the NOR gate number 2
5	IN2 B	Input B of the NOR gate number 2
6	OUT2	Output of the NOR 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 NOR gate number 3
11	IN3 B	Input B of the NOR gate number 3
12	IN3 A	Input A of the NOR gate number 3
13	OUT4	Output of the NOR gate number 4
14	IN4 B	Input B of the NOR gate number 4
15	IN4 A	Input A of the NOR gate number 4
16	VDD	Circuit core power supply terminal.

Function Table

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

Function and Logical Diagrams

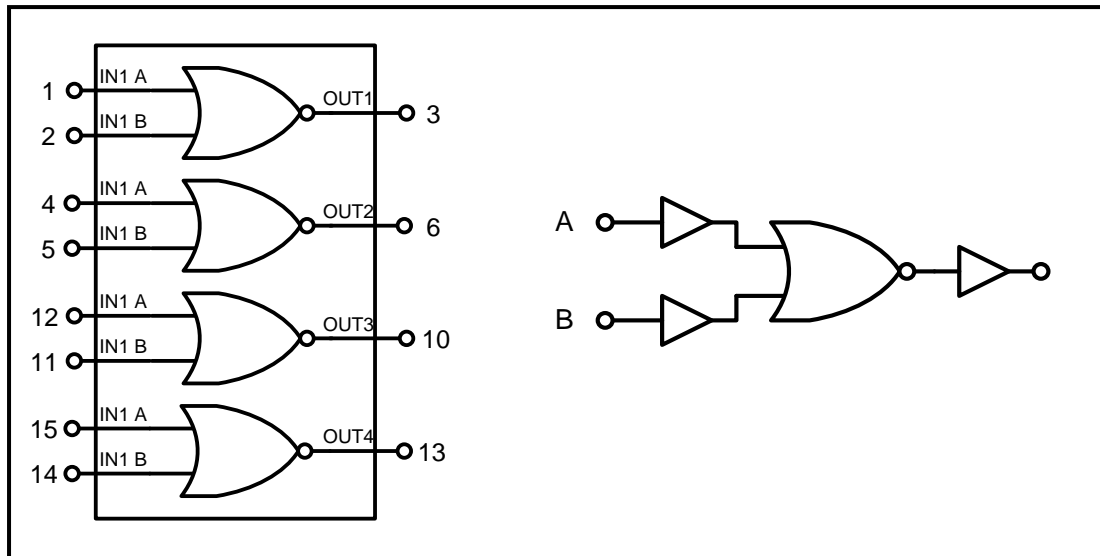


Figure 1. CMT-74021: simplified block diagram.

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>685</u>	
	$V_{DD} = 5V, T_j = 175^\circ\text{C}$			<u>690</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 or B to Y ¹ t_{PHL}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		7.1	9.4	ns
		$T_j=25^\circ\text{C}$		8.5	11.7	
		$T_j=175^\circ\text{C}$		12	17	
Propagation delay time from A or B to Y t_{PLH}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		6.5	9.1	ns
		$T_j=25^\circ\text{C}$		8.2	11.6	
		$T_j=175^\circ\text{C}$		12.5	16.6	
Output transition time High to Low t_{THL}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		6.3	8.2	ns
		$T_j=25^\circ\text{C}$		7.7	10.3	
		$T_j=175^\circ\text{C}$		11.2	15.5	
Output transition time Low to High t_{TLH}	$C_L=50\text{pF}$	$T_j=-55^\circ\text{C}$		5.7	8	ns
		$T_j=25^\circ\text{C}$		7.5	10.6	
		$T_j=175^\circ\text{C}$		10.5	14.8	

¹ Input A is 1% to 2% faster than input B.

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}	$C_L=50pF$	$T_j=-55^\circ C$		13.8	22	ns
		$T_j=25^\circ C$		16.5	26.3	
		$T_j=175^\circ C$		21.8	34.5	
Propagation delay time from A or B to Y t_{PLH}	$C_L=50pF$	$T_j=-55^\circ C$		12.7	20.6	ns
		$T_j=25^\circ C$		15.4	25.2	
		$T_j=175^\circ C$		20.2	32.5	
Output transition time High to Low t_{THL}	$C_L=50pF$	$T_j=-55^\circ C$		12.5	20.1	ns
		$T_j=25^\circ C$		16.5	23.3	
		$T_j=175^\circ C$		22.2	31.5	
Output transition time Low to High t_{TLH}	$C_L=50pF$	$T_j=-55^\circ C$		10.2	16.6	ns
		$T_j=25^\circ C$		12.8	21.4	
		$T_j=175^\circ C$		17.2	26.8	

AC Waveforms

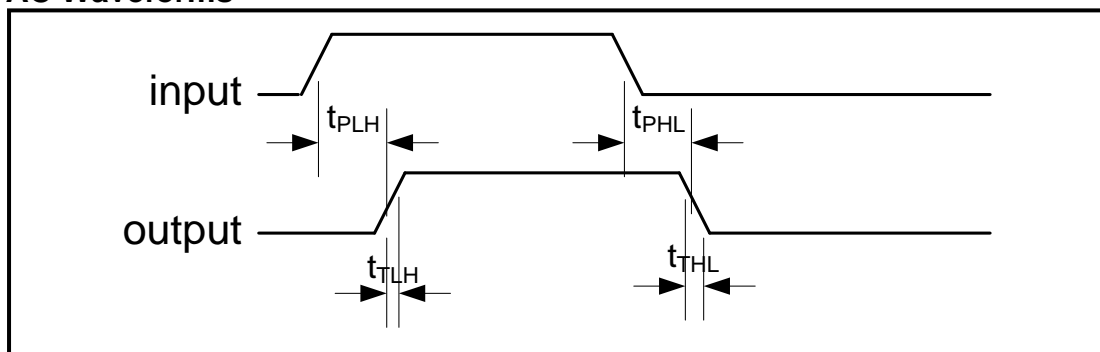
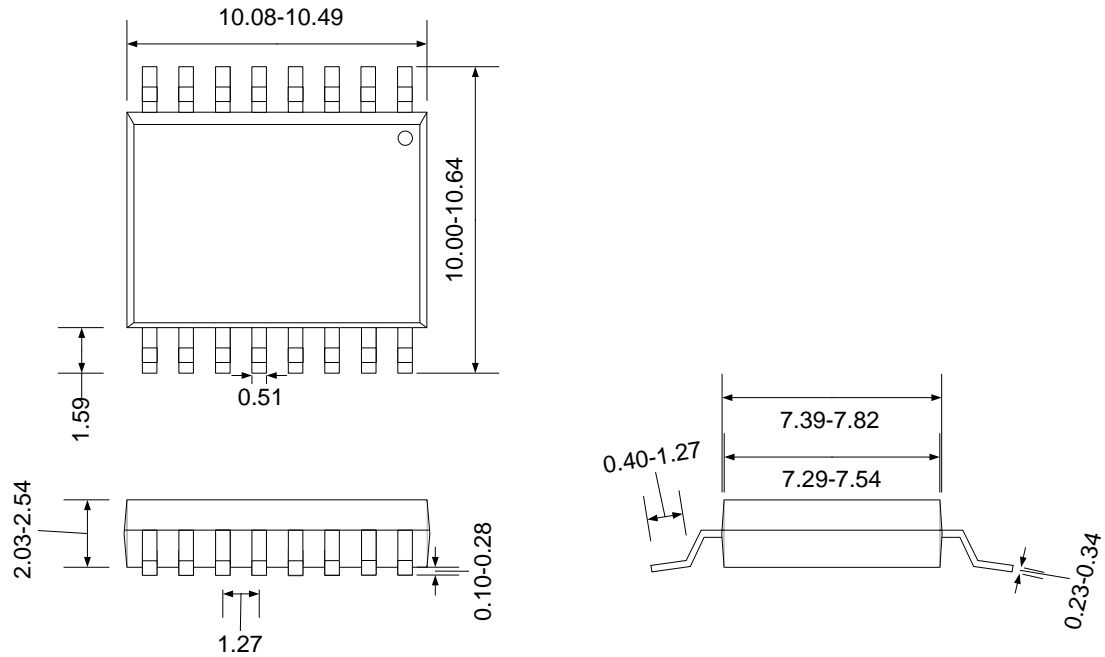


Figure 2. AC Waveforms

Ordering Information

Ordering Reference	Package	Temperature Range	Marking
CMT-74021-PSOIC16-T	Plastic SOIC16	-55°C to +175°C	CMT-74021

Package dimensions



Drawing PSOIC16 (mm +/- 10%)

Contact & Ordering

CISSOID S.A.

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