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The Leader in High Temperature Semiconductor Solutions

CMT-74021 DATASHEET

Revision: 01.4
23-Dec-13
(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 (±10%).

Features

- Qualified from -55 to +175°C (Tj)
- 3.3 to 5V (±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

PSOIC16

IN1 A	1	16 VDD
IN1 B	2	15 IN4 A
OUT1	3	14 IN4 B
IN2 A	4	13 OUT4
IN2 B	5	12 IN3 A
OUT2	6	11 IN3 B
VSS	7	10 OUT3
N.C.	8	9 N.C.

CMT-74021
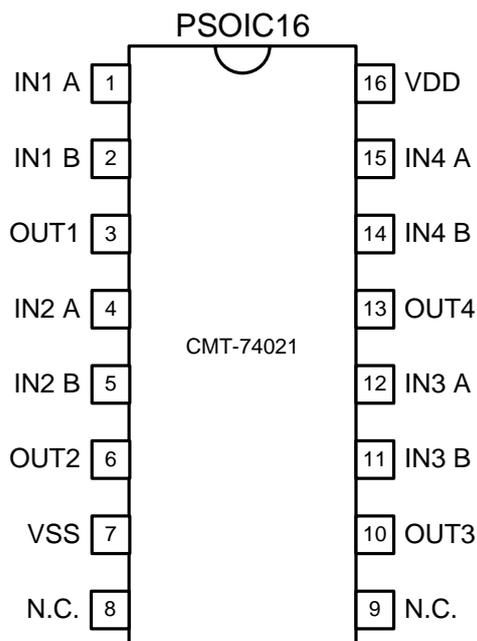
Pin	Symbol	Description
1	**IN1 A**	Input A of the NOR gate number 1
2	**IN1 B**	Input B of the NOR gate number 1
3	**OUT1**	Output of the NOR gate number 1
4	**IN2 A**	Input A of the NOR gate number 2
5	**IN2 B**	Input B of the NOR gate number 2
6	**OUT2**	Output of the NOR gate number 2
7	**VSS**	Circuit 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.

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Function Table

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

Function and Logical Diagrams
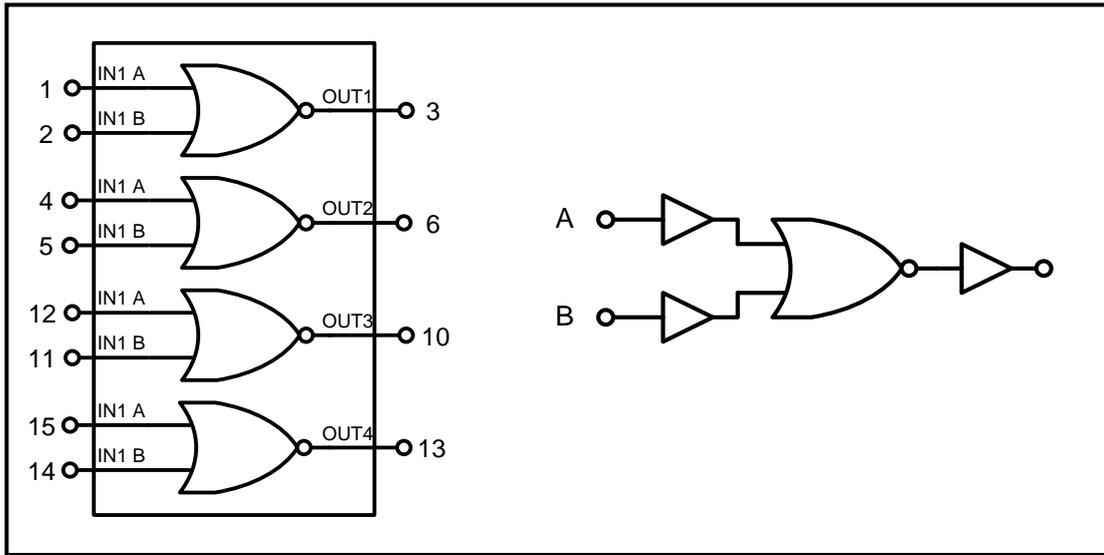
Figure 1. CMT-74021: simplified block diagram.

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

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 +175°C

DC Electrical Characteristics

Unless otherwise stated: $\underline{T_j=25°C}$. **Bold underlined** figures indicate values valid over the whole temperature range (-55°C < T_j < +175°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°C			4	nA
	V_{DD} = 5V, T_j=-55°C			6	
	V_{DD} = 3.3V, T_j=175°C			**685**	
	V_{DD} = 5V, T_j=175°C			**690**	
Minimum HIGH level output voltage V_{OH}	V_{DD} = 3.3V, I_{OH}<2mA (source)	**2.46**			V
	V_{DD} = 5V, I_{OH}<4mA (source)	**4.47**			
Maximum LOW level output voltage V_{OL}	V_{DD} = 3.3V, I_{OL}<2mA (sink)			**0.41**	V
	V_{DD} = 5V, I_{OL}<4mA (sink)			**0.59**	
Minimum HIGH level input voltage V_{IH}	V_{DD} = 3.3V	**2.2**			V
	V_{DD} = 5V	**3.3**			
Maximum LOW level input voltage V_{IL}	V_{DD} = 3.3V			**1.5**	V
	V_{DD} = 5V			**2.2**	

AC Electrical Characteristics

Unless otherwise stated: VDD=5V, $\underline{T_j=25°C}$. **Bold underlined** figures indicate values valid over the whole temperature range (-55°C < T_j < +175°C).

Parameter	Condition	Temperature	Min	Typ	Max	Units
Propagation delay time from A or B to Y[1] **t_PHL**	C_L=50pF	T_j=-55°C		7.1	9.4	ns
		T_j=25°C		8.5	11.7	
		T_j=175°C		12	17	
Propagation delay time from A or B to Y **t_PLH**	C_L=50pF	T_j=-55°C		6.5	9.1	ns
		T_j=25°C		8.2	11.6	
		T_j=175°C		12.5	16.6	
Output transition time High to Low **t_THL**	C_L=50pF	T_j=-55°C		6.3	8.2	ns
		T_j=25°C		7.7	10.3	
		T_j=175°C		11.2	15.5	
Output transition time Low to High **t_TLH**	C_L=50pF	T_j=-55°C		5.7	8	ns
		T_j=25°C		7.5	10.6	
		T_j=175°C		10.5	14.8	

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


AC Electrical Characteristics (cntd)

Unless otherwise stated: VDD=3.3V, $\underline{T_j=25°C}$. **Bold underlined** figures indicate values valid over the whole temperature range (-55°C < T_j < +175°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		13.8	22	ns
		T_j=25°C		16.5	26.3	
		T_j=175°C		21.8	34.5	
Propagation delay time from A or B to Y t_{PLH}	C_L=50pF	T_j=-55°C		12.7	20.6	ns
		T_j=25°C		15.4	25.2	
		T_j=175°C		20.2	32.5	
Output transition time High to Low t_{THL}	C_L=50pF	T_j=-55°C		12.5	20.1	ns
		T_j=25°C		16.5	23.3	
		T_j=175°C		22.2	31.5	
Output transition time Low to High t_{TLH}	C_L=50pF	T_j=-55°C		10.2	16.6	ns
		T_j=25°C		12.8	21.4	
		T_j=175°C		17.2	26.8	

AC Waveforms
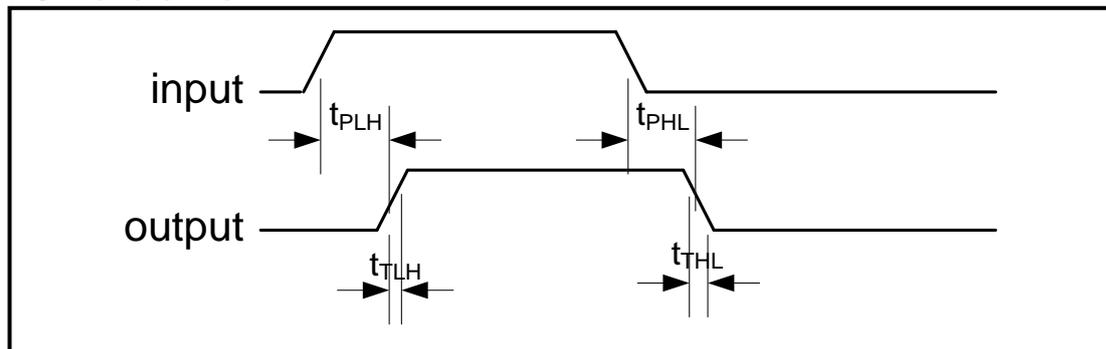
Figure 2. AC Waveforms

Ordering Information

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

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Package dimensions

10.08-10.49

10.00-10.64

1.59

0.51

2.03-2.54

0.10-0.28

1.27

0.40-1.27

7.39-7.82

7.29-7.54

0.23-0.34
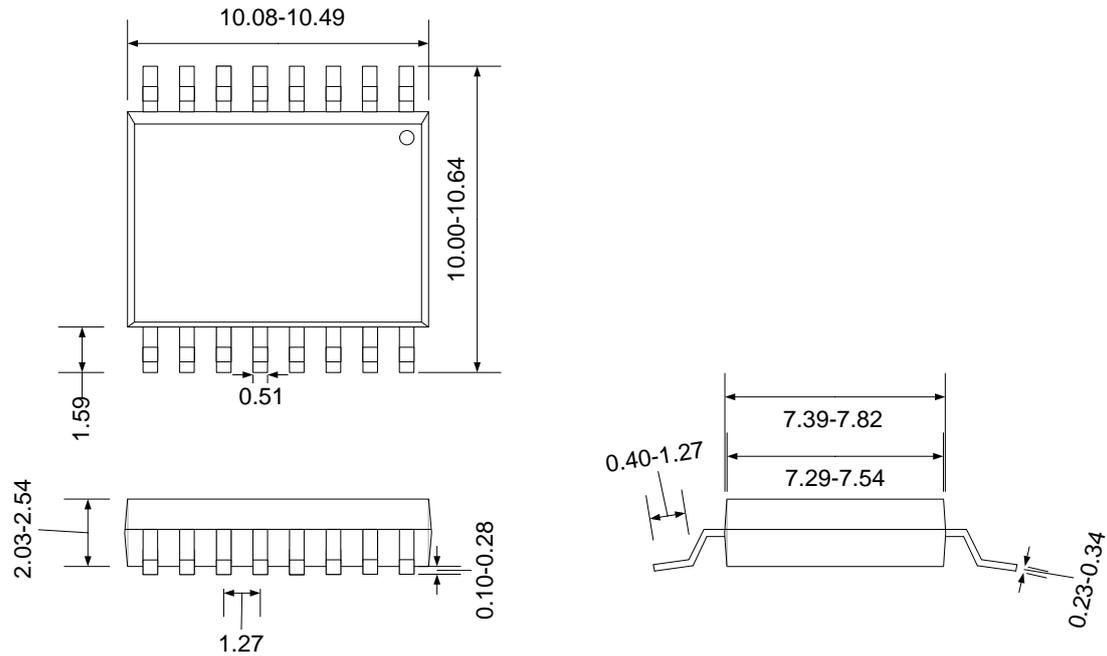
Drawing PSOIC16 (mm +/- 10%)

Contact & Ordering

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