

## CMT-7408 DATASHEET

*Revision: 01.4  
23-Dec-13  
(Last Modified Date)*

## High-Temperature, Quad 2-inputs AND Gate

### General Description

The CMT-7408 contains four independent 2-inputs AND gates, performing the Boolean function :

$$Y = A \cdot B$$

The CMT-7408 can operate with supply voltages from 3.3 to 5V ( $\pm 10\%$ ).

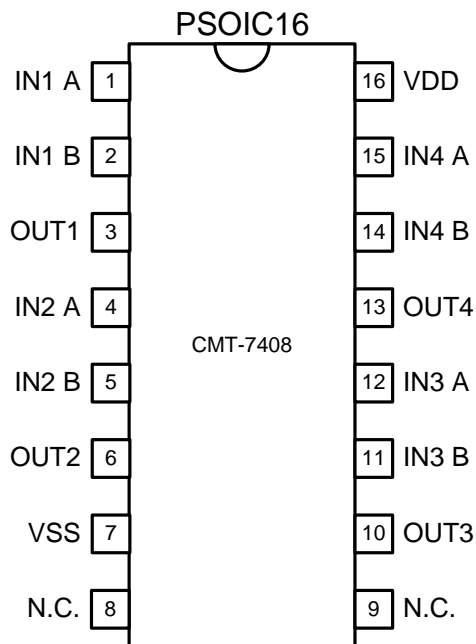
### Features

- 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

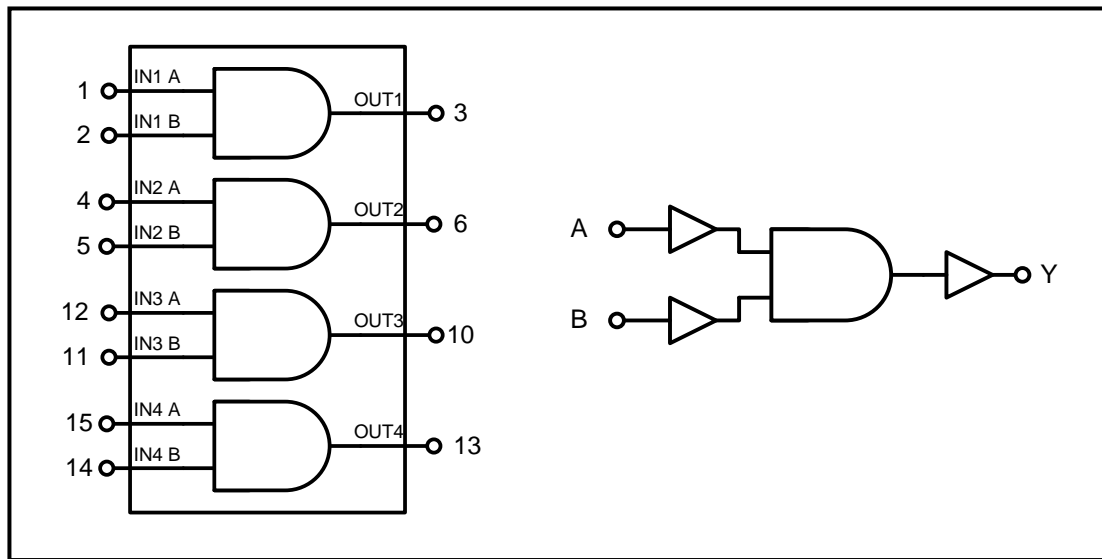


| Pin | Symbol | Description                         |
|-----|--------|-------------------------------------|
| 1   | IN1 A  | Input A of the AND gate number 1    |
| 2   | IN1 B  | Input B of the AND gate number 1    |
| 3   | OUT1   | Output of the AND gate number 1     |
| 4   | IN2 A  | Input A of the AND gate number 2    |
| 5   | IN2 B  | Input B of the AND gate number 2    |
| 6   | OUT2   | Output of the AND 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 AND gate number 3     |
| 11  | IN3 B  | Input B of the AND gate number 3    |
| 12  | IN3 A  | Input A of the AND gate number 3    |
| 13  | OUT4   | Output of the AND gate number 4     |
| 14  | IN4 B  | Input B of the AND gate number 4    |
| 15  | IN4 A  | Input A of the AND gate number 4    |
| 16  | VDD    | Circuit core power supply terminal. |

**Function Table**

| INPUT |   | OUTPUT |
|-------|---|--------|
| A     | B | Y      |
| L     | L | L      |
| L     | H | L      |
| H     | L | L      |
| H     | H | H      |

**Function and Logical Diagrams**



**Figure 1. CMT-7408: 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  $V_{DD}+0.5V$ 
**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                  |       |
|  | $V_{DD} = 3.3V, T_j = 175^\circ\text{C}$      |                    |     | <b><u>685</u></b>  |       |
|  | $V_{DD} = 5V, T_j = 175^\circ\text{C}$        |                    |     | <b><u>690</u></b>  |       |
| Minimum HIGH level output voltage $V_{OH}$ | $V_{DD} = 3.3V, I_{OH} < 2\text{mA}$ (source) | <b><u>2.46</u></b> |     |                    | V     |
|  | $V_{DD} = 5V, I_{OH} < 4\text{mA}$ (source)   | <b><u>4.47</u></b> |     |                    |       |
| Maximum LOW level output voltage $V_{OL}$  | $V_{DD} = 3.3V, I_{OL} < 2\text{mA}$ (sink)   |                    |     | <b><u>0.41</u></b> | V     |
|  | $V_{DD} = 5V, I_{OL} < 4\text{mA}$ (sink)     |                    |     | <b><u>0.59</u></b> |       |
| Minimum HIGH level input voltage $V_{IH}$  | $V_{DD} = 3.3V$                               | <b><u>2.2</u></b>  |     |                    | V     |
|  | $V_{DD} = 5V$                                 | <b><u>3.3</u></b>  |     |                    |       |
| Maximum LOW level input voltage $V_{IL}$   | $V_{DD} = 3.3V$                               |                    |     | <b><u>1.5</u></b>  | V     |
|  | $V_{DD} = 5V$                                 |                    |     | <b><u>2.2</u></b>  |       |

### 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 ( $-55^\circ\text{C} < T_j < +175^\circ\text{C}$ ).

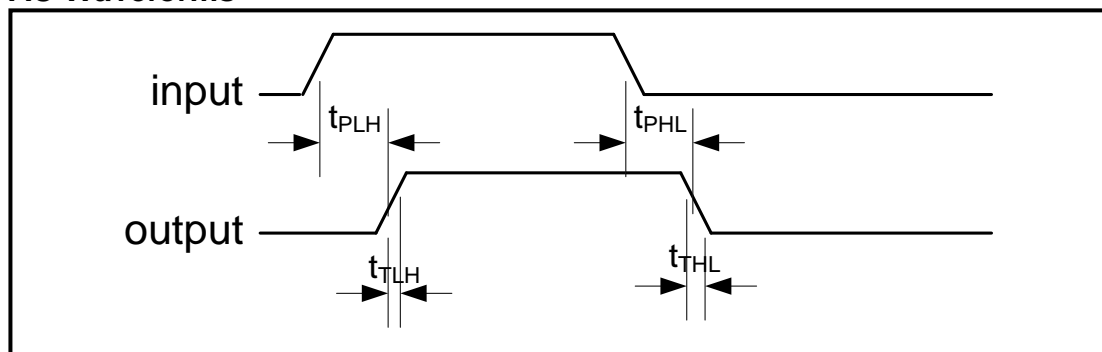
| Parameter   | Condition         | Temperature             | Min | Typ  | Max   | Units |
|---|-------------------|-------------------------|-----|------|-------|-------|
| Propagation delay time from A or B to Y <sup>1</sup><br>$t_{PHL}$ | $C_L=50\text{pF}$ | $T_j=-55^\circ\text{C}$ |     | 7.78 | 10.38 | ns    |
|   |                   | $T_j=25^\circ\text{C}$  |     | 9.51 | 13.00 |       |
|   |                   | $T_j=175^\circ\text{C}$ |     | 13   | 18.4  |       |
| Propagation delay time from A or B to Y<br>$t_{PLH}$              | $C_L=50\text{pF}$ | $T_j=-55^\circ\text{C}$ |     | 6.95 | 9.57  | ns    |
|   |                   | $T_j=25^\circ\text{C}$  |     | 8.69 | 12.23 |       |
|   |                   | $T_j=175^\circ\text{C}$ |     | 12   | 17.2  |       |
| Output transition time High to Low<br>$t_{THL}$                   | $C_L=50\text{pF}$ | $T_j=-55^\circ\text{C}$ |     | 3.28 | 8.10  | ns    |
|   |                   | $T_j=25^\circ\text{C}$  |     | 7.44 | 10.35 |       |
|   |                   | $T_j=175^\circ\text{C}$ |     | 11.2 | 15.2  |       |
| Output transition time Low to High<br>$t_{TLH}$                   | $C_L=50\text{pF}$ | $T_j=-55^\circ\text{C}$ |     | 5.66 | 7.87  | ns    |
|   |                   | $T_j=25^\circ\text{C}$  |     | 7.44 | 10.35 |       |
|   |                   | $T_j=175^\circ\text{C}$ |     | 10.5 | 14.5  |       |

<sup>1</sup> Input A is 1% to 2% faster than input B.

**AC Electrical Characteristics (cntd)**

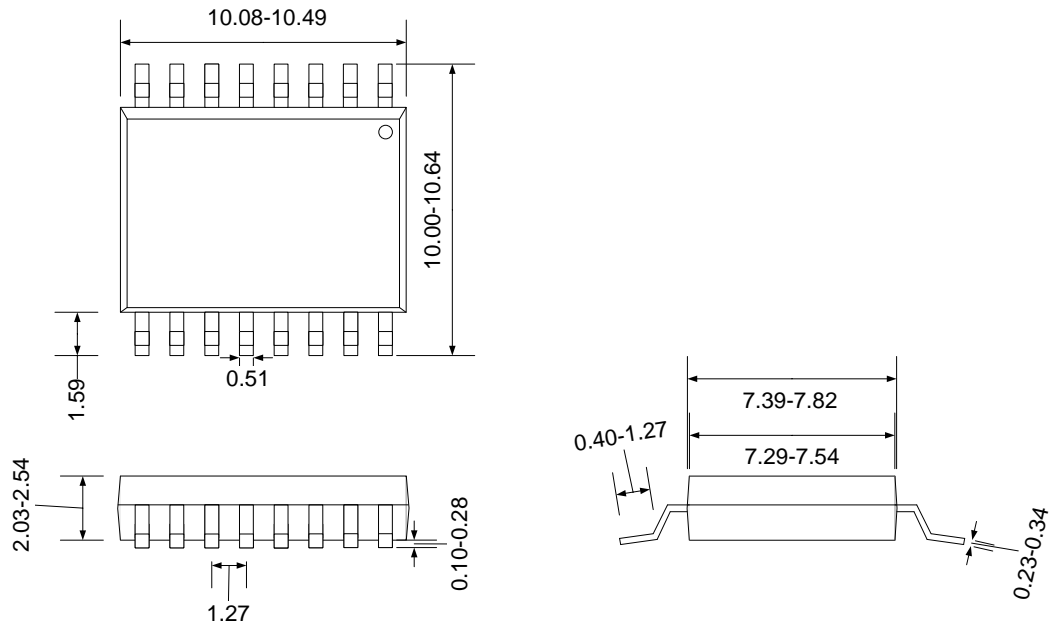
 Unless otherwise stated:  $V_{DD}=3.3V$ ,  $T_j=25^{\circ}C$ . **Bold underlined** figures indicate values valid over the whole temperature range ( $-55^{\circ}C < T_j < +175^{\circ}C$ ).

| Parameter  | Condition  | Temperature        | Min | Typ   | Max   | Units |
|--|------------|--------------------|-----|-------|-------|-------|
| Propagation delay time from A or B to Y<br>$t_{PHL}$ | $C_L=50pF$ | $T_j=-55^{\circ}C$ |     | 15.07 | 24.04 | ns    |
|  |            | $T_j=25^{\circ}C$  |     | 18.04 | 28.89 |       |
|  |            | $T_j=175^{\circ}C$ |     | 23.2  | 37    |       |
| Propagation delay time from A or B to Y<br>$t_{PLH}$ | $C_L=50pF$ | $T_j=-55^{\circ}C$ |     | 13.51 | 22.06 | ns    |
|  |            | $T_j=25^{\circ}C$  |     | 16.50 | 26.91 |       |
|  |            | $T_j=175^{\circ}C$ |     | 21.2  | 34.2  |       |
| Output transition time High to Low<br>$t_{THL}$      | $C_L=50pF$ | $T_j=-55^{\circ}C$ |     | 12.07 | 19.16 | ns    |
|  |            | $T_j=25^{\circ}C$  |     | 14.57 | 22.76 |       |
|  |            | $T_j=175^{\circ}C$ |     | 19.8  | 30    |       |
| Output transition time Low to High<br>$t_{TLH}$      | $C_L=50pF$ | $T_j=-55^{\circ}C$ |     | 10.02 | 16.11 | ns    |
|  |            | $T_j=25^{\circ}C$  |     | 12.49 | 19.6  |       |
|  |            | $T_j=175^{\circ}C$ |     | 16.4  | 25    |       |

**AC Waveforms**

**Figure 2. AC Waveforms**
**Ordering Information**

| Ordering Reference | Package        | Temperature Range                 | Marking  |
|--------------------|----------------|-----------------------------------|----------|
| CMT-7408-PSOIC16-T | Plastic SOIC16 | $-55^{\circ}C$ to $+175^{\circ}C$ | CMT-7408 |

## Package Dimensions



Drawing PSOIC16 (mm +/- 10%)

## Contact & Ordering

CISSOID S.A.

|                                       |   |
|---------------------------------------|---|
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