EVALUATION BOARD MANUAL

TEMPERATURE SENSOR IC

<table>
<thead>
<tr>
<th>Evaluation board order code</th>
<th>Sensor order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2521020222591</td>
<td>2521020222501</td>
</tr>
</tbody>
</table>

VERSION 1.0

FEBRUARY 19, 2020
# Revision history

<table>
<thead>
<tr>
<th>Manual version</th>
<th>Product version</th>
<th>Notes</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>1.0</td>
<td>• Initial release of the manual</td>
<td>February 2020</td>
</tr>
</tbody>
</table>
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I²C</td>
<td>Inter integrated circuit</td>
</tr>
<tr>
<td>n.m.</td>
<td>not mounted</td>
</tr>
</tbody>
</table>
1 General description

1.1 Introduction

The evaluation board of the temperature sensor provides an opportunity to verify the sensor performance and develop a prototype using an external processor e.g. Amber Pi design kit (Part No: 2609017281001). It can be directly plugged to Amber Pi design kit using the mounted I²C interface pins. It can also be placed on a bread board using through hole pin header connections.

The temperature sensor IC (Part No: 2521020222501) is a 16-bit compact silicon based digital temperate sensor with an I²C interface. The sensor features programmable temperature thresholds and interrupt functionality.

![Evaluation board for the temperature sensor IC](image)

Figure 1: Evaluation board for the temperature sensor IC

1.2 Ordering information

<table>
<thead>
<tr>
<th>WE order code</th>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2521020222501</td>
<td>2.0 x 2.0 x 0.5 mm</td>
<td>tape &amp; reel packaging</td>
</tr>
<tr>
<td>2521020222581</td>
<td>2.0 x 2.0 x 0.5 mm</td>
<td>5 pcs cut tape packaging</td>
</tr>
<tr>
<td>2521020222591</td>
<td>33 x 20 mm</td>
<td>Evaluation board temperature sensor IC</td>
</tr>
</tbody>
</table>

Table 1: Ordering information
2 Functional description

The temperature sensor evaluation board supports the standard I²C communication interface.

- A positive supply voltage is applied to the sensor through \( VDD \) pin.
- The 7-bit I²C slave address of the temperature sensor is either 0111000b or 0111111b based on the \( SAO \) pin connection.

By default the 7-bit slave address of the temperature sensor on the evaluation board is 0111000b (0x38). i.e. \( SAO \) pin of the sensor is connected to \( VDD \) using 0\( \Omega \) resistor ADDR.

The 7-bit slave address of the temperature sensor can be changed to 0111111b (0x3F) by removing 0\( \Omega \) resistor ADDR from '1' part and mounting it on the '0' part of the evaluation board. i.e. \( SAO \) pin is connected to \( GND \) using 0\( \Omega \) resistor ADDR.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Name</th>
<th>Function</th>
<th>I/O</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( SCL )</td>
<td>I²C serial clock</td>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>( INT )</td>
<td>Interrupt</td>
<td>Output</td>
<td>Do not connect if not used</td>
</tr>
<tr>
<td>3</td>
<td>( VDD )</td>
<td>Positive supply voltage</td>
<td>Supply</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>( SAO )</td>
<td>I²C device address selection</td>
<td>Input</td>
<td>High: device address is 0111000b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low: device address is 0111111b</td>
</tr>
<tr>
<td>5</td>
<td>( GND )</td>
<td>Negative supply voltage</td>
<td>Supply</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>( SDA )</td>
<td>I²C serial data</td>
<td>Input/Output</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Pin description

Please refer to the data sheet of the temperature sensor (Order code: 2521020222501) for more information about the electrical properties.
2.1 Evaluation board in operation

2.1.1 Pin header connection

![Pin header connection to the external boards. e.g. Amber Pi design kit](image)

Figure 2: Pin header connection to the external boards. e.g. Amber Pi design kit

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>SCL</td>
</tr>
<tr>
<td>3</td>
<td>SDA</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>INT</td>
</tr>
<tr>
<td>6</td>
<td>VDD</td>
</tr>
</tbody>
</table>

Table 3: Pin header to the external boards

The pin configuration of the mounted pin header is same as other sensor evaluation boards from Würth Elektronik eiSos.

When the evaluation board is connected to Amber Pi design kit using I²C interface pins, INT interrupt pin function will not be available.
### Component Description

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R5</td>
<td>Open. Connect a 0Ω resistor to enable the interrupt function on INT pin.</td>
</tr>
<tr>
<td>C4</td>
<td>Open. Optional 10 µF decoupling capacitor can be connected in parallel to the C5.</td>
</tr>
<tr>
<td>ADDR</td>
<td>Defines 7-bit slave address for I²C communication. Slave address of the sensor is 0111000b (0x38). SAO is connected to VDD.</td>
</tr>
</tbody>
</table>

Table 4: Functionality of the resistors and capacitors on the evaluation board

#### 2.1.2 Through hole connection

Through hole pin header connection gives direct access to each sensor pin. SDA, SCL and INT pins must be connected to VDD via pull-up resistors. SAO pin connection to either VDD or GND is also necessary in order to define an I²C slave address.

Figure 3: Through hole connection

Please refer to the application circuit described in the user manual of the sensor (Order code: 2521020222501) for more information.
3 Evaluation board

3.1 Schematic diagram

Figure 4: Schematic diagram
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