# Revision history

<table>
<thead>
<tr>
<th>Manual version</th>
<th>FW version</th>
<th>HW version</th>
<th>Notes</th>
<th>Date</th>
</tr>
</thead>
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<tr>
<td>1.0 - 1.2</td>
<td>12.2</td>
<td>1.1</td>
<td>• Initial version</td>
<td>June 2018</td>
</tr>
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<td>2.1</td>
<td>12.2</td>
<td>1.1</td>
<td>• New corporate design and structure</td>
<td>November 2018</td>
</tr>
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<td>12.2</td>
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1 Introduction

1.1 Operational description

Würth Elektronik eiSos provides with the Puck-I a certified, qualified and listed Bluetooth class 2 module. It is based on LMX9830 from Texas Instruments. This module is qualified for a serial data or audio transmission.

The module has an integrated PCB-antenna and can be placed into a circuit with surface mount techniques.

Puck-I comes with an integrated firmware with the complete Bluetooth Stack (Bluetooth 2.0). The stack supports SPP, GAP, SDAP, DUN, OBEX, HSP and other profiles.

A Point-to-Point connection and a Point-to-Multipoint (Piconet) connection are supported by the firmware. Up to seven active links (Piconet) and one SCO-link (Audio) are possible.

The module can be integrated easily in a system. According to the application and the settings the Puck-I can work as a stand-alone-slave-module e.g. as a virtual cable replacement in combination with any other commercial Bluetooth system.
1.2 Block diagram

![Block diagram](image)

Figure 1: Block diagram

1.3 Ordering information

<table>
<thead>
<tr>
<th>WE order code</th>
<th>Former order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2604021024001</td>
<td>AMB2301</td>
<td>Bluetooth 2.0 module 2.4 GHz with integrated PCB antenna</td>
</tr>
<tr>
<td>2604021024000</td>
<td>AMB2301-TR</td>
<td>Bluetooth 2.0 module 2.4 GHz with integrated PCB antenna, Tape &amp; Reel</td>
</tr>
<tr>
<td>2604021024009</td>
<td>AMB2301-DEV</td>
<td>Bluetooth 2.0 module development kit</td>
</tr>
<tr>
<td>2004029024001</td>
<td>AMB2301-EV</td>
<td>Bluetooth 2.0 evaluation kit</td>
</tr>
</tbody>
</table>

Table 1: Ordering information
## 2 Physical parameters

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage supply</td>
<td>2.9 to 3.6V</td>
</tr>
<tr>
<td>Current consumption</td>
<td>typ. 65mA</td>
</tr>
<tr>
<td>RF output</td>
<td>typ. 0dBm (Class 2)</td>
</tr>
<tr>
<td>Rx sensitivity</td>
<td>typ. -80dBm</td>
</tr>
<tr>
<td>Data rate UART</td>
<td>2.4 to 921.6 kbits/s</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40 °C to 85 °C</td>
</tr>
<tr>
<td>Antenna</td>
<td>Integrated PCB antenna</td>
</tr>
<tr>
<td>Maximum input level</td>
<td>-10dBm</td>
</tr>
<tr>
<td>Dimension</td>
<td>27.5 x 16.0 x 3.5mm</td>
</tr>
<tr>
<td>Bluetooth default PIN</td>
<td>0000</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>All further technical data are according to the LMX9830 IC documentation of Texas Instruments</td>
</tr>
</tbody>
</table>

Table 2: Physical parameters
3 Pinout

Figure 2: Pinout (top view)
<table>
<thead>
<tr>
<th>Pin name</th>
<th>Typ</th>
<th>Notice</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND</td>
<td></td>
<td>Ground</td>
</tr>
<tr>
<td>OP3</td>
<td>I</td>
<td>Must be connected to VCC</td>
</tr>
<tr>
<td>PG7</td>
<td>I/O</td>
<td>GPIO (default setting: UART activity)</td>
</tr>
<tr>
<td>SCLK</td>
<td>I/O</td>
<td>Audio PCM Interface Clock</td>
</tr>
<tr>
<td>SFS</td>
<td>I/O</td>
<td>Audio PCM Interface Frame Synchronization</td>
</tr>
<tr>
<td>SRD</td>
<td>I</td>
<td>Audio PCM Interface Receive Data Input</td>
</tr>
<tr>
<td>STD</td>
<td>O</td>
<td>Audio PCM Interface Transmit Data Output</td>
</tr>
<tr>
<td>OP5</td>
<td>I</td>
<td>Configuration UART-data rate at Start up</td>
</tr>
<tr>
<td>OP4</td>
<td>I/O</td>
<td>Configuration UART-data rate at Start up, otherwise GPIO</td>
</tr>
<tr>
<td>/RESET</td>
<td>I</td>
<td>Reset, internal Pull up, active low</td>
</tr>
<tr>
<td>/CTS</td>
<td>I</td>
<td>Host Serial Port Clear To Send, active low</td>
</tr>
<tr>
<td>/RTS</td>
<td>O</td>
<td>Host Serial Port Request To Send, active low</td>
</tr>
<tr>
<td>UTXD</td>
<td>O</td>
<td>Host Serial Port Transmit Data</td>
</tr>
<tr>
<td>URXD</td>
<td>I</td>
<td>Host Serial Port Receive Data</td>
</tr>
<tr>
<td>PG6</td>
<td>I/O</td>
<td>GPIO (default setting: BT link status)</td>
</tr>
<tr>
<td>RESERVED</td>
<td></td>
<td>Reserved. Do not connect.</td>
</tr>
<tr>
<td>VCC</td>
<td></td>
<td>Power supply, 2.9V to 3.6V</td>
</tr>
</tbody>
</table>

Table 3: Pinout

3.1 Minimum connection to run the Puck-I

In order to realize a radio transmission, the following connections of the Puck-I have to be wired:

1. VCC, GND: Power supply
2. URXD, UTXD: UART data
3. /RTS, /CTS: UART handshake; if does not need: short RTS and CTS or contact CTS at GND (without flow control it can come to overrun and lost data)
4. OP3: High (connect to VCC)
5. OP4, OP5: Configuration UART (open or 1K pull-up)

All other pins don’t need to be connected.

---

1 I = Input, O = Output
2 Connect with ground if not used
3 Not connected if not used
3.2 Default settings

All parameters are stored inside the internal EEPROM. In the Bluetooth environment, the device announces itself as a Xxxxxxx (Device Name), whereas Xxxxxxx has to be replaced by the device’s Bluetooth address.

3.3 Detailed Description

3.3.1 UART configuration

The serial interface of the Puck-I must be configured as follows:

<table>
<thead>
<tr>
<th>OP4</th>
<th>OP5</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>Open</td>
<td>UART speed read from NVS (EEPROM)</td>
</tr>
<tr>
<td>Open</td>
<td>High</td>
<td>UART speed 9.6 kbps</td>
</tr>
<tr>
<td>High</td>
<td>Open</td>
<td>UART speed 115.2 kbps</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>UART speed 921.6 kbps</td>
</tr>
</tbody>
</table>

Use external 1kΩ pull ups to achieve compatible OP4 and OP5 HIGH level.

While module boot up OP4 and OP5 are pulled down internally. Using other pull up resistor values as stated above can lead to malfunctions.

3.3.2 UART interface

The interface serves for communication with the Puck-I. Hardware handshake is used (RTS/CTS). If this should not be supported by the host system, /RTS and /CTS must be short circuit or /CTS pulled down to LOW level. This can lead to data loss due to overrun of either the module or the host. Therefore it is highly recommended to use UART handshake.

3.3.3 Details to the remaining connections of the Puck-I

1. /RESET: Internal Pull up, low active, no external pull up recommended
2. SCLK, SFS, SRD, STD: Audio interface, if not used, pins does not attached
3. PG6, PG7: I/O ports, if not used, pins does not attached
4. VCC, GND: Power supply
3.4 Command Interface

The Puck-I based on LMX9830 provides a simple Commando Interface. Detailed Information can be found in the IC documentation from the Texas Instruments homepage. To simplify the use of this commands further a PC tool, the "Simply Blue Commander" is available from the Texas Instruments homepage.
4 Hardware integration

4.1 Dimension

Figure 3: Measures, recommended distance to antenna
4.2 Design recommendation

4.2.1 Layout

To achieve the maximum of range no metal (ground, strip line, components, etc..) has to be near the antenna, as shown hatched in the following figure. The antenna should have a distance of minimum 12.5mm to any ground, strip line or component. Most suitable is to place the antenna at the edge of the motherboard.

Caution: The Puck-I is not isolated on the bottom side, so even if there are normally no short circuit problems because of the solder resist, an isolation should be placed between Puck-I and motherboard in case of any copper on the top side of the motherboard underneath the Puck-I.

4.2.2 Power supply

For a reliable operation of the module, the power supply has to be provided with a slew rate over 3V per 500 microseconds. Take care of having no voltage on any pin until the power supply is turned on properly. Further advice on the power supply can be obtained from the Ti LMX9830 documentation.

Pay attention to remaining charges of smoothing capacitors.

4.2.3 System start up sequence

Apply VCC to the module. For a reliable operation of the module, the power supply has to be provided with a slew rate over 3V per 500 microseconds. The RESET_BB should be driven high for another 1ms after VCC is stable. A typical module start up time is 30ms.
5 Migration from AMB2300 to Puck-I

There is no modification required regarding hardware connection or connection to the host (soft and hardware).

Due to the new integrated antenna any Radio Matters inside the end application shall be retested.

No modification concerning the Bluetooth listing is required, as the Puck-I comes under the same Declaration ID as the AMB2300. Customer Listings are supposed to link to the Declaration ID "D013784" of Puck-I.

Bluetooth Listing of end applications and devices is mandatory.
6 References

[1 ] LMX9830 Data Sheet
[3 ] Simply Blue Commander
7 Design in guide

7.1 Advice for schematic and layout

For users with less RF experience it is advisable to closely copy the relating evaluation board with respect to schematic and layout, as it is a proven design. The layout should be conducted with particular care, because even small deficiencies could affect the radio performance and its range or even the conformity.

The following general advice should be taken into consideration:

- A clean, stable power supply is strongly recommended. Interference, especially oscillation can severely restrain range and conformity.
- Variations in voltage level should be avoided.
- LDOs, properly designed in, usually deliver a proper regulated voltage.
- Blocking capacitors and a ferrite bead in the power supply line can be included to filter and smoothen the supply voltage when necessary.

No fixed values can be recommended, as these depend on the circumstances of the application (main power source, interferences etc.).

Frequently switching the module on and off, especially with a slowly changing voltage level of the power supply, can lead to erratic behavior, in rare cases even as far as damaging the module or the firmware. The use of an external reset IC can solve this matter and shall be considered especially in battery operated scenarios.

- Elements for ESD protection should be placed on all pins that are accessible from the outside and should be placed close to the accessible area. For example, the RF-pin is accessible when using an external antenna and should be protected.
- ESD protection for the antenna connection must be chosen such as to have a minimum effect on the RF signal. For example, a protection diode with low capacitance such as the LXES15AAA1-100 or a 68 nH air-core coil connecting the RF-line to ground give good results.
- Placeholders for optional antenna matching or additional filtering are recommended.
- The antenna path should be kept as short as possible.
Again, no fixed values can be recommended, as they depend on the influencing circumstances of the application (antenna, interferences etc.).

![Figure 4: Layout](image)

- To avoid the risk of short circuits and interference there should be no routing underneath the module on the top layer of the baseboard.
- On the second layer, a ground plane is recommended, to provide good grounding and shielding to any following layers and application environment.
- In case of integrated antennas it is required to have areas free from ground. This area should be copied from the evaluation board.
- The area with the integrated antenna must overlap with the carrier board and should not protrude, as it is matched to sitting directly on top of a PCB.
- Modules with integrated antennas should be placed with the antenna at the edge of the main board. It should not be placed in the middle of the main board or far away from the edge. This is to avoid tracks beside the antenna.
- Filter and blocking capacitors should be placed directly in the tracks without stubs, to achieve the best effect.
- Antenna matching elements should be placed close to the antenna / connector, blocking capacitors close to the module.
- Ground connections for the module and the capacitors should be kept as short as possible and with at least one separate through hole connection to the ground layer.
- ESD protection elements should be placed as close as possible to the exposed areas.
7.2 Dimensioning of the micro strip antenna line

The antenna track has to be designed as a 50Ω feed line. The width $W$ for a micro strip can be calculated using the following equation:

$$W = 1.25 \times \left( \frac{5.98 \times H}{\varepsilon_r \times \sqrt{\varepsilon_r + 1.41}} - T_{met} \right)$$

(1)

Example:
A FR4 material with $\varepsilon_r = 4.3$, a height $H = 1000 \mu m$ and a copper thickness of $T_{met} = 18 \mu m$
will lead to a trace width of $W \sim 1.9$ mm. To ease the calculation of the micro strip line (or e.g. a coplanar) many calculators can be found in the internet.

- As rule of thumb a distance of about $3 \times W$ should be observed between the micro strip and other traces / ground.
- The micro strip refers to ground, therefore there has to be the ground plane underneath the trace.
- Keep the feeding line as short as possible.

### 7.3 Antenna solutions

There exist several kinds of antennas, which are optimized for different needs. Chip antennas are optimized for minimal size requirements but at the expense of range, PCB antennas are optimized for minimal costs, and are generally a compromise between size and range. Both usually fit inside a housing.

Range optimization in general is at the expense of space. Antennas that are bigger in size, so that they would probably not fit in a small housing, are usually equipped with a RF connector. A benefit of this connector may be to use it to lead the RF signal through a metal plate (e.g. metal housing, cabinet).

As a rule of thumb a minimum distance of $\lambda/10$ (which is $3.5$ cm @ $868$ MHz and $1.2$ cm @ $2.44$ GHz) from the antenna to any other metal should be kept. Metal placed further away will not directly influence the behavior of the antenna, but will anyway produce shadowing.

- Keep the antenna away from large metal objects as far as possible to avoid electromagnetic field blocking.
- The choice of antenna might have influence on the safety requirements.

In the following chapters, some special types of antenna are described.

#### 7.3.1 Wire antenna

An effective antenna is a $\lambda/4$ radiator with a suiting ground plane. The simplest realization is a piece of wire. It's length is depending on the used radio frequency, so for example $8.6$ cm $868.0$ MHz and $3.1$ cm for $2.440$ GHz as frequency. This radiator needs a ground plane at its feeding point. Ideally, it is placed vertically in the middle of the ground plane. As this is often not possible because of space requirements, a suitable compromise is to bend the wire away from the PCB respective to the ground plane. The $\lambda/4$ radiator has approximately $40$ $\Omega$ input impedance, therefore matching is not required.
7.3.2 Chip antenna

There are many chip antennas from various manufacturers. The benefit of a chip antenna is obviously the minimal space required and reasonable costs. However, this is often at the expense of range. For the chip antennas, reference designs should be followed as closely as possible, because only in this constellation can the stated performance be achieved.

7.3.3 PCB antenna

PCB antenna designs can be very different. The special attention can be on the miniaturization or on the performance. The benefits of the PCB antenna are their small / not existing (if PCB space is available) costs, however the evaluation of a PCB antenna holds more risk of failure than the use of a finished antenna. Most PCB antenna designs are a compromise of range and space between chip antennas and connector antennas.
7.3.4 Antennas provided by Würth Elektronik eiSos

7.3.4.1 2600130011 - Helike - 169 MHz dipole antenna

![169 MHz dipole-antenna](image)

Figure 7: 169 MHz dipole-antenna

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range [MHz]</td>
<td>169</td>
</tr>
<tr>
<td>Impedance [Ω]</td>
<td>50</td>
</tr>
<tr>
<td>VSWR</td>
<td>≤ 2.1</td>
</tr>
<tr>
<td>Gain [dBi]</td>
<td>1</td>
</tr>
<tr>
<td>Dimensions (L x d) [mm]</td>
<td>320 x 15</td>
</tr>
<tr>
<td>Weight [g]</td>
<td>42</td>
</tr>
<tr>
<td>Connector</td>
<td>SMA plug</td>
</tr>
<tr>
<td>Operating Temp. [°C]</td>
<td>-40 – +85</td>
</tr>
</tbody>
</table>

This antenna requires a ground plane which will influence the electrical parameters.
7.3.4.2 2600130041 - Herse - 434 MHz dipole antenna

Figure 8: 434 MHz dipole-antenna

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range [MHz]</td>
<td>433</td>
</tr>
<tr>
<td>Impedance [Ω]</td>
<td>50</td>
</tr>
<tr>
<td>VSWR</td>
<td>≤ 1.5</td>
</tr>
<tr>
<td>Polarization</td>
<td>Vertical</td>
</tr>
<tr>
<td>Radiation</td>
<td>Omni</td>
</tr>
<tr>
<td>Gain [dBi]</td>
<td>0</td>
</tr>
<tr>
<td>Antenna Cover</td>
<td>TPEE</td>
</tr>
<tr>
<td>Dimensions (L x d) [mm]</td>
<td>90 x 12</td>
</tr>
<tr>
<td>Weight [g]</td>
<td>9.6</td>
</tr>
<tr>
<td>Connector</td>
<td>SMA plug</td>
</tr>
<tr>
<td>Operating Temp. [°C]</td>
<td>-40 – +80</td>
</tr>
</tbody>
</table>

This antenna requires a ground plane which will influence the electrical parameters.
7.3.4.3 2600130081 - Hyperion-I - 868 MHz dipole antenna

Figure 9: 868 MHz dipole-antenna

Ideally suited for applications where no ground plane is available.

The 2600130081 antenna can be also used for 902MHz - 928MHz range.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center frequency [MHz]</td>
<td>868</td>
</tr>
<tr>
<td>Frequency range [MHz]</td>
<td>853 – 883</td>
</tr>
<tr>
<td>Wavelength</td>
<td>0.5 wave</td>
</tr>
<tr>
<td>VSWR</td>
<td>≤ 2.0</td>
</tr>
<tr>
<td>Impedance [Ω]</td>
<td>50</td>
</tr>
<tr>
<td>Connector</td>
<td>SMA (Male)</td>
</tr>
<tr>
<td>Dimensions (L x d) [mm]</td>
<td>142 x 10</td>
</tr>
<tr>
<td>Peak gain [dBi]</td>
<td>-2.3</td>
</tr>
<tr>
<td>Operating temp. [°C]</td>
<td>-30 – +80</td>
</tr>
</tbody>
</table>
7.3.4.4 2600130082 - Hyperion-II - 868 MHz magnetic base antenna

Well suited for applications where the RF is lead through a metal wall that could serve as ground plane to the antenna.

![Image of 868 MHz magnet foot antenna with 1.5 m antenna cable]

Figure 10: 868 MHz magnet foot antenna with 1.5 m antenna cable

The 2600130082 is a kind of $\lambda/4$ radiator and therefore needs a ground plane at the feeding point.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range [MHz]</td>
<td>824 – 894</td>
</tr>
<tr>
<td>VSWR</td>
<td>$\leq$ 2.0</td>
</tr>
<tr>
<td>Polarisation</td>
<td>Vertical</td>
</tr>
<tr>
<td>Impedance [Ω]</td>
<td>50±5</td>
</tr>
<tr>
<td>Connector</td>
<td>SMA (Male)</td>
</tr>
<tr>
<td>Dimensions (L x d) [mm]</td>
<td>89.8 x 27</td>
</tr>
<tr>
<td>Weight [g]</td>
<td>50±5</td>
</tr>
<tr>
<td>Operating temp. [°C]</td>
<td>-30 – +60</td>
</tr>
</tbody>
</table>
7.3.4.5 2600130021 - Himalia - 2.4 GHz dipole antenna

Due to the fact, that the antenna has dipole topology there is no need for an additional ground plane. Nevertheless the specification was measured edge mounted and 90° bent on a 100 x 100 mm ground plane.

![Figure 11: 2.4 GHz dipole-antenna](image)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range [GHz]</td>
<td>2.4 – 2.5</td>
</tr>
<tr>
<td>Impedance [Ω]</td>
<td>50</td>
</tr>
<tr>
<td>VSWR</td>
<td>≤ 2:1</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear</td>
</tr>
<tr>
<td>Radiation</td>
<td>Omni-Directional</td>
</tr>
<tr>
<td>Peak Gain [dBi]</td>
<td>2.8</td>
</tr>
<tr>
<td>Average Gain [dBi]</td>
<td>-0.6</td>
</tr>
<tr>
<td>Efficiency</td>
<td>85 %</td>
</tr>
<tr>
<td>Dimensions (L x d) [mm]</td>
<td>83.1 x 10</td>
</tr>
<tr>
<td>Weight [g]</td>
<td>7.4</td>
</tr>
<tr>
<td>Connector</td>
<td>SMA plug</td>
</tr>
<tr>
<td>Operating temp. [°C]</td>
<td>-40 – +80</td>
</tr>
</tbody>
</table>
8 Manufacturing information

8.1 Moisture sensitivity level

This wireless connectivity product is categorized as JEDEC Moisture Sensitivity Level 3 (MSL3), which requires special handling.

More information regarding the MSL requirements can be found in the IPC/JEDEC J-STD-020 standard on www.jedec.org.

More information about the handling, picking, shipping and the usage of moisture/reflow and/or process sensitive products can be found in the IPC/JEDEC J-STD-033 standard on www.jedec.org.

8.2 Soldering

8.2.1 Reflow soldering

Attention must be paid on the thickness of the solder resist between the host PCB top side and the modules bottom side. Only lead-free assembly is recommended according to JEDEC J-STD020.

<table>
<thead>
<tr>
<th>Profile feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat temperature Min</td>
<td>$T_{S\text{ Min}}$</td>
</tr>
<tr>
<td>Preheat temperature Max</td>
<td>$T_{S\text{ Max}}$</td>
</tr>
<tr>
<td>Preheat time from $T_{S\text{ Min}}$ to $T_{S\text{ Max}}$</td>
<td>$t_S$</td>
</tr>
<tr>
<td>Ramp-up rate ($T_L$ to $T_P$)</td>
<td></td>
</tr>
<tr>
<td>Liquidous temperature</td>
<td>$T_L$</td>
</tr>
<tr>
<td>Time $t_L$ maintained above $T_L$</td>
<td>$t_L$</td>
</tr>
<tr>
<td>Peak package body temperature</td>
<td>$T_P$</td>
</tr>
<tr>
<td>Time within 5°C of actual peak temperature</td>
<td>$t_P$</td>
</tr>
<tr>
<td>Ramp-down Rate ($T_P$ to $T_L$)</td>
<td></td>
</tr>
<tr>
<td>Time 20°C to $T_P$</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Classification reflow soldering profile, Note: refer to IPC/JEDEC J-STD-020E
Table 5: Package classification reflow temperature, PB-free assembly, Note: refer to IPC-/JEDEC J-STD-020E

<table>
<thead>
<tr>
<th>Package thickness</th>
<th>Volume mm³ &lt;350</th>
<th>Volume mm³ 350-2000</th>
<th>Volume mm³ &gt;2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1.6mm</td>
<td>260 °C</td>
<td>260 °C</td>
<td>260 °C</td>
</tr>
<tr>
<td>1.6mm - 2.5mm</td>
<td>260 °C</td>
<td>250 °C</td>
<td>245 °C</td>
</tr>
<tr>
<td>&gt; 2.5mm</td>
<td>250 °C</td>
<td>245 °C</td>
<td>245 °C</td>
</tr>
</tbody>
</table>

It is recommended to solder this module on the last reflow cycle of the PCB. For solder paste use a LFM-48W or Indium based SAC 305 alloy (Sn 96.5 / Ag 3.0 / Cu 0.5 / Indium 8.9HF / Type 3 / 89%) type 3 or higher.

The reflow profile must be adjusted based on the thermal mass of the entire populated PCB, heat transfer efficiency of the reflow oven and the specific type of solder paste used. Based on the specific process and PCB layout the optimal soldering profile must be adjusted and verified. Other soldering methods (e.g. vapor phase) have not been verified and have to be validated by the customer at their own risk. Rework is not recommended.

Figure 12: Reflow soldering profile

After reflow soldering, visually inspect the board to confirm proper alignment
8.2.2 Cleaning

Do not clean the product. Any residue cannot be easily removed by washing. Use a "no clean" soldering paste and do not clean the board after soldering.

- Do not clean the product with water. Capillary effects can draw water into the gap between the host PCB and the module, absorbing water underneath it. If water is trapped inside, it may short-circuit adjoining pads. The water may also destroy the label and ink-jet printed text on it.

- Cleaning processes using alcohol or other organic solvents may draw solder flux residues into the housing, which won't be detected in a post-wash inspection. The solvent may also destroy the label and ink-jet printed text on it.

- Do not use ultrasonic cleaning as it will permanently damage the part, particularly the crystal oscillators.

8.2.3 Other notations

- Conformal coating of the product will result in the loss of warranty. The RF shields will not protect the part from low-viscosity coatings.

- Do not attempt to improve the grounding by forming metal strips directly to the EMI covers or soldering on ground cables, as it may damage the part and will void the warranty.

- Always solder every pad to the host PCB even if some are unused, to improve the mechanical strength of the module.

- The part is sensitive to ultrasonic waves, as such do not use ultrasonic cleaning, welding or other processing. Any ultrasonic processing will void the warranty.

8.3 ESD handling

This product is highly sensitive to electrostatic discharge (ESD). As such, always use proper ESD precautions when handling. Make sure to handle the part properly throughout all stages of production, including on the host PCB where the module is installed. For ESD ratings, refer to the module series' maximum ESD section. For more information, refer to the relevant chapter 2. Failing to follow the aforementioned recommendations can result in severe damage to the part.

- the first contact point when handling the PCB is always between the local GND and the host PCB GND, unless there is a galvanic coupling between the local GND (for example work table) and the host PCB GND.

- Before assembling an antenna patch, connect the grounds.

- While handling the RF pin, avoid contact with any charged capacitors and be careful when contacting any materials that can develop charges (for example coaxial cable with around 50-80 pF/m, patch antenna with around 10 pF, soldering iron etc.)
• Do not touch any exposed area of the antenna to avoid electrostatic discharge. Do not let the antenna area be touched in a non ESD-safe manner.

• When soldering, use an ESD-safe soldering iron.

8.4 Safety recommendations

It is your duty to ensure that the product is allowed to be used in the destination country and within the required environment. Usage of the product can be dangerous and must be tested and verified by the end user. Be especially careful of:

• Use in areas with risk of explosion (for example oil refineries, gas stations).

• Use in areas such as airports, aircraft, hospitals, etc., where the product may interfere with other electronic components.

It is the customer’s responsibility to ensure compliance with all applicable legal, regulatory and safety-related requirements as well as applicable environmental regulations. Disassembling the product is not allowed. Evidence of tampering will void the warranty.

• Compliance with the instructions in the product manual is recommended for correct product set-up.

• The product must be provided with a consolidated voltage source. The wiring must meet all applicable fire and security prevention standards.

• Handle with care. Avoid touching the pins as there could be ESD damage.

Be careful when working with any external components. When in doubt consult the technical documentation and relevant standards. Always use an antenna with the proper characteristics.

Since the module itself is not fused the voltage supply shall be fed from a limited power source according to EN 62368-1 class PS1.

Modules with high output power of up to 500mW, as for example the Thebe family, generate a high amount of warmth while transmitting. The manufacturer of the end device must take care of potentially necessary actions for his application.
9 Marking

9.1 Lot number

The 15 digit lot number is printed in numerical digits as well as in form of a machine readable bar code. It is divided into 5 blocks as shown in the following picture and can be translated according to the following table.

![Lot number structure diagram]

Figure 13: Lot number structure

<table>
<thead>
<tr>
<th>Block</th>
<th>Information</th>
<th>Example(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>eiSos internal, 3 digits</td>
<td>439</td>
</tr>
<tr>
<td>2</td>
<td>eiSos internal, 2 digits</td>
<td>01</td>
</tr>
<tr>
<td>3</td>
<td>Hardware version, 3 digits</td>
<td>V2.4 = 024, V12.2 = 122</td>
</tr>
<tr>
<td>4</td>
<td>Date code, 4 digits</td>
<td>1703 = week 03 in year 2017,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1816 = week 16 in year 2018</td>
</tr>
<tr>
<td>5</td>
<td>Firmware version, 3 digits</td>
<td>V3.2 = 302, V5.13 = 513</td>
</tr>
</tbody>
</table>

Table 6: Lot number details

As the user can perform a firmware update the printed lot number only shows the factory delivery state. The currently installed firmware can be requested from the module using the corresponding product specific command. The firmware version as well as the hardware version are restricted to show only major and minor version not the patch identifier.
9.2 General labeling information

The module labels may include the following fields:

- Manufacturer identification WE, Würth Elektronik or Würth Elektronik eiSos
- WE Order Code and/or article alias
- Serial number or MAC address
- Certification identifiers (CE, FCC ID, IC, ARIB,...)
- Barcode or 2D code containing the serial number or MAC address

The serial number includes the product ID (PID) and an unique 6 digit number. The first 1 to 3 digits represent the PID, then the "." marks the start of the 6 digit counter to create a unique product marking.

In case of small labels, the 3 byte manufacturer identifier (0x0018DA) of the MAC address is not printed on the labels. The 3 byte counter printed on the label can be used with this 0018DA to produce the full MAC address by appending the counter after the manufacturer identifier.

9.2.1 Example labels of Würth Elektronik eiSos products

<table>
<thead>
<tr>
<th>Label Example</th>
<th>Label Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="" /></td>
<td>AMB2621</td>
</tr>
<tr>
<td><img src="image2.png" alt="" /></td>
<td>SN: 0A6495</td>
</tr>
<tr>
<td><img src="image3.png" alt="" /></td>
<td>FCCID:</td>
</tr>
<tr>
<td><img src="image4.png" alt="" /></td>
<td>R7TAMB2621</td>
</tr>
<tr>
<td><img src="image5.png" alt="" /></td>
<td><img src="image6.png" alt="" /></td>
</tr>
<tr>
<td><img src="image7.png" alt="" /></td>
<td><img src="image8.png" alt="" /></td>
</tr>
<tr>
<td><img src="image9.png" alt="" /></td>
<td><img src="image10.png" alt="" /></td>
</tr>
<tr>
<td><img src="image11.png" alt="" /></td>
<td><img src="image12.png" alt="" /></td>
</tr>
<tr>
<td><img src="image13.png" alt="" /></td>
<td><img src="image14.png" alt="" /></td>
</tr>
<tr>
<td><img src="image15.png" alt="" /></td>
<td><img src="image16.png" alt="" /></td>
</tr>
<tr>
<td><img src="image17.png" alt="" /></td>
<td><img src="image18.png" alt="" /></td>
</tr>
<tr>
<td><img src="image19.png" alt="" /></td>
<td><img src="image20.png" alt="" /></td>
</tr>
</tbody>
</table>

*Puck-I reference manual version 2.2 © March 2019
www.we-online.com/wireless-connectivity*
10 Information for Ex Protection

In case the end product should be used in Ex protection areas the following information can be used:

- The module itself is unfused.

- The maximum output power of the module is $0\text{dBm}$.

- The total amount of capacitivity of all capacitors is $4.843\mu\text{F}$. 
11 Regulatory compliance information

11.1 Important notice EU

The use of RF frequencies is limited by national regulations. The Puck-I has been designed to comply with the R&TTE directive 1999/5/EC and the RED directive 2014/53/EU of the European Union (EU).

The Puck-I can be operated without notification and free of charge in the area of the European Union. However, according to the R&TTE / RED directive, restrictions (e.g. in terms of duty cycle or maximum allowed RF power) may apply.

11.2 Important notice FCC

The use of RF frequencies is limited by national regulations. The Puck-I has been designed to comply with the FCC Part 15.

The Puck-I can be operated without notification and free of charge in the area of the United States of America. However, according to the FCC Part 15, restrictions (e.g. in terms of maximum allowed RF power and antenna) may apply.

11.3 Conformity assessment of the final product

The Puck-I is a subassembly. It is designed to be embedded into other products (products incorporating the Puck-I are henceforward referred to as "final products").

It is the responsibility of the manufacturer of the final product to ensure that the final product is in compliance with the essential requirements of the underlying national radio regulations. The conformity assessment of the subassembly Puck-I carried out by Würth Elektronik eiSos does not replace the required conformity assessment of the final product.

11.4 Exemption clause

Relevant regulation requirements are subject to change. Würth Elektronik eiSos does not guarantee the accuracy of the before mentioned information. Directives, technical standards, procedural descriptions and the like may be interpreted differently by the national authorities. Equally, the national laws and restrictions may vary with the country. In case of doubt or uncertainty, we recommend that you consult with the authorities or official certification organizations of the relevant countries. Würth Elektronik eiSos is exempt from any responsibilities or liabilities related to regulatory compliance.

Notwithstanding the above, Würth Elektronik eiSos makes no representations and warranties of any kind related to their accuracy, correctness, completeness and/or usability for customer applications. No responsibility is assumed for inaccuracies or incompleteness.
11.5 EU Declaration of conformity

EU DECLARATION OF CONFORMITY

Radio equipment: 2604021024000

The manufacturer: Würth Elektronik eiSos GmbH & Co. KG
Max-Eyth-Straße 1
74638 Waldenburg

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration: 2604021024000

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation: Directive 2014/53/EU and 2011/65/EU.
Following harmonised norms or technical specifications have been applied:

- EN 300 328-1 V2.1.1 (2016-11)
- EN 301 489-1 V2.2.0 (Draft)
- EN 301 489-17 V3.2.0 (Draft)
- EN 62479 : 2010

Trier, 30th of October 2018
Place and date of issue
11.6 FCC Compliance Statement

FCC ID: R7TAMB2301

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

(FCC 15.19)

Modifications (FCC 15.21)

Caution: Changes or modifications for this equipment not expressly approved by Würth Elektronik eiSos may void the FCC authorization to operate this equipment.

11.7 IC Compliance Statement

Certification Number: 5136A-AMB2301

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes : (1) l’appareil ne doit pas produire de brouillage, et (2) l’utilisateur de l’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.
12 Bluetooth product listing certificate

PRODUCT LISTING CERTIFICATE

This is to certify that the qualification requirements for the below stated product have been reviewed and BQC acknowledged. As a result thereof an End Product Listing entry has been created which can be found following the above stated hyperlink.

Product ID: AM82301
Declaration ID: D013764
Related QD ID(s): 10627
Member Company: Amber wireless GmbH
Listing Date: 2018-02-05
Listing Link: https://aunachard.ainf.com/ListingDetails/123123
Covered Functionality: Baseband Conformance, Generic Access Profile, Interoperability Test Specification, Link Manager, Logical Link Control and Adaptation Protocol, Radio, RFCOMM, Serial Port Profile, Service Discovery Application Profile, Service Discovery Protocol

BQC: Roland Becker
RS-WWS Limited, Room 2108, 21/F., C C Wu Building, 302-308 Hennessy Road, Hong Kong

signature
13 Important information

The following conditions apply to all goods within the wireless connectivity product range of Würth Elektronik eiSos GmbH & Co. KG:

13.1 General customer responsibility

Some goods within the product range of Würth Elektronik eiSos GmbH & Co. KG contain statements regarding general suitability for certain application areas. These statements about suitability are based on our knowledge and experience of typical requirements concerning the areas, serve as general guidance and cannot be estimated as binding statements about the suitability for a customer application. The responsibility for the applicability and use in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to the customer to evaluate, where appropriate to investigate and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for the respective customer application or not. Accordingly, the customer is cautioned to verify that the documentation is current before placing orders.

13.2 Customer responsibility related to specific, in particular safety-relevant applications

It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications. The same statement is valid for all software and firmware parts contained in or used with or for products in the wireless connectivity product range of Würth Elektronik eiSos GmbH & Co. KG. In certain customer applications requiring a high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health, it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component.

13.3 Best care and attention

Any product-specific datasheets, manuals, application notes, PCN's, warnings and cautions must be strictly observed in the most recent versions and matching to the products firmware revisions. This documents can be downloaded from the product specific sections on the wireless connectivity homepage.

13.4 Customer support for product specifications

Some products within the product range may contain substances, which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case, the field sales engineer or the internal sales person in charge should be contacted who will be happy to support in this matter.
13.5 Product improvements

Due to constant product improvement, product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard, we inform about major changes in hard- or firmware. In case of further queries regarding the PCN, the field sales engineer, the internal sales person or the technical support team in charge should be contacted. The basic responsibility of the customer as per section 13.1 and 13.2 remains unaffected.

13.6 Product life cycle

Due to technical progress and economical evaluation we also reserve the right to discontinue production and delivery of products. As a standard reporting procedure of the Product Termination Notification (PTN) according to the JEDEC-Standard we will inform at an early stage about inevitable product discontinuance. According to this, we cannot ensure that all products within our product range will always be available. Therefore, it needs to be verified with the field sales engineer or the internal sales person in charge about the current product availability expectancy before or when the product for application design-in disposal is considered. The approach named above does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

13.7 Property rights

All the rights for contractual products produced by Würth Elektronik eiSos GmbH & Co. KG on the basis of ideas, development contracts as well as models or templates that are subject to copyright, patent or commercial protection supplied to the customer will remain with Würth Elektronik eiSos GmbH & Co. KG. Würth Elektronik eiSos GmbH & Co. KG does not warrant or represent that any license, either expressed or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, application, or process in which Würth Elektronik eiSos GmbH & Co. KG components or services are used.

13.8 General terms and conditions

Unless otherwise agreed in individual contracts, all orders are subject to the current version of the "General Terms and Conditions of Würth Elektronik eiSos Group", last version available at www.we-online.com.
14 Legal notice

14.1 Exclusion of liability

Würth Elektronik eiSos GmbH & Co. KG considers the information in this document to be correct at the time of publication. However, Würth Elektronik eiSos GmbH & Co. KG reserves the right to modify the information such as technical specifications or functions of its products or discontinue the production of these products or the support of one of these products without any written announcement or notification to customers. The customer must make sure that the information used corresponds to the latest published information. Würth Elektronik eiSos GmbH & Co. KG does not assume any liability for the use of its products. Würth Elektronik eiSos GmbH & Co. KG does not grant licenses for its patent rights or for any other of its intellectual property rights or third-party rights. Notwithstanding anything above, Würth Elektronik eiSos GmbH & Co. KG makes no representations and/or warranties of any kind for the provided information related to their accuracy, correctness, completeness, usage of the products and/or usability for customer applications. Information published by Würth Elektronik eiSos GmbH & Co. KG regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof.

14.2 Suitability in customer applications

The customer bears the responsibility for compliance of systems or units, in which Würth Elektronik eiSos GmbH & Co. KG products are integrated, with applicable legal regulations. Customer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of Würth Elektronik eiSos GmbH & Co. KG components in its applications, notwithstanding any applications-related information or support that may be provided by Würth Elektronik eiSos GmbH & Co. KG. Customer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences lessen the likelihood of failures that might cause harm and take appropriate remedial actions. The customer will fully indemnify Würth Elektronik eiSos GmbH & Co. KG and its representatives against any damages arising out of the use of any Würth Elektronik eiSos GmbH & Co. KG components in safety-critical applications.

14.3 Trademarks

AMBER wireless is a registered trademark of Würth Elektronik eiSos GmbH & Co. KG. All other trademarks, registered trademarks, and product names are the exclusive property of the respective owners.

14.4 Usage restriction

Würth Elektronik eiSos GmbH & Co. KG products have been designed and developed for usage in general electronic equipment only. This product is not authorized for use in equipment where a higher safety standard and reliability standard is especially required or where a failure of the product is reasonably expected to cause severe personal injury or death, unless the parties have executed an agreement specifically governing such use. Moreover,
Würth Elektronik eiSos GmbH & Co. KG products are neither designed nor intended for use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network etc. Würth Elektronik eiSos GmbH & Co. KG must be informed about the intent of such usage before the design-in stage. In addition, sufficient reliability evaluation checks for safety must be performed on every electronic component, which is used in electrical circuits that require high safety and reliability function or performance. By using Würth Elektronik eiSos GmbH & Co. KG products, the customer agrees to these terms and conditions.
15 License agreement for Würth Elektronik eiSos GmbH & Co. KG connectivity product firmware and software

Agreement between You and Würth Elektronik eiSos GmbH & Co. KG

The following terms of this license agreement for the usage of the Würth Elektronik eiSos GmbH & Co. KG wireless connectivity product firmware are a legal agreement between you and Würth Elektronik eiSos GmbH & Co. KG and/or its subsidiaries and affiliates (collectively, "Würth Elektronik eiSos"). You hereby agree that this license agreement is applicable to the product and the incorporated software and firmware (collectively, "Firmware") made available by Würth Elektronik eiSos in any form, including but not limited to binary, executable or source code form.

The Firmware included in any Würth Elektronik eiSos wireless connectivity product is purchased to you on the condition that you accept the terms and conditions of this license agreement. You agree to comply with all provisions under this license agreement.

15.1 Limited license

Würth Elektronik eiSos hereby grants you a limited, non-exclusive, non-transferable and royalty-free license to use the Firmware under the conditions that will be set forth in this license agreement. You are free to use the provided Firmware only in connection with one of the products from Würth Elektronik eiSos to the extent described in this license agreement. You are not entitled to change or alter the provided Firmware.

You are not entitled to transfer the Firmware in any form to third parties without prior written consent of Würth Elektronik eiSos.

You are not allowed to reproduce, translate, reverse engineer, read out, decompile, disassemble or create derivative works of the incorporated Firmware in whole or in part.

No more extensive rights to use and exploit the Firmware granted to you.

15.2 Usage and obligations

The responsibility for the applicability and use of the Würth Elektronik eiSos wireless connectivity product with the incorporated Firmware in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to you to evaluate and investigate, where appropriate, and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for your respective application or not.

You are responsible for using the Würth Elektronik eiSos Product with the incorporated Firmware in compliance with all applicable product liability and product safety laws. You acknowledge to minimize the risk of loss and harm to individuals and bear the risk for failure leading to personal injury or death due to your usage of the product.

Würth Elektronik eiSos’ products with the incorporated Firmware are not authorized for use in safety-critical applications, or where a failure of the product is reasonably expected to cause severe personal injury or death. Moreover, Würth Elektronik eiSos’ products with the incorporated Firmware are neither designed nor intended for use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train
control, ship control), transportation signal, disaster prevention, medical, public information network etc. You shall inform Würth Elektronik eiSos about the intent of such usage before design-in stage. In certain customer applications requiring a very high level of safety and in which the malfunction or failure of an electronic component could endanger human life or health, you must ensure to have all necessary expertise in the safety and regulatory ramifications of your applications. You acknowledge and agree that you are solely responsible for all legal, regulatory and safety-related requirements concerning your products and any use of Würth Elektronik eiSos’ products with the incorporated Firmware in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by Würth Elektronik eiSos. YOU SHALL INDEMNIFY WÜRTH ELEKTRONIK EISOS AGAINST ANY DAMAGES ARISING OUT OF THE USE OF WÜRTH ELEKTRONIK EISOS’ PRODUCTS WITH THE INCORPORATED FIRMWARE IN SUCH SAFETY-CRITICAL APPLICATIONS.

15.3 Ownership

The incorporated Firmware created by Würth Elektronik eiSos is and will remain the exclusive property of Würth Elektronik eiSos.

15.4 Firmware update(s)

You have the opportunity to request the current and actual firmware for a bought wireless connectivity Product within the time of warranty. However, Würth Elektronik eiSos has no obligation to update a modules firmware in their production facilities, but can offer this as a service on request. The upload of firmware updates falls within your responsibility, e.g. via ACC or another software for firmware updates. Firmware updates will not be communicated automatically. It is within your responsibility to check the current version of a firmware in the latest version of the product manual on our website. The revision table in the product manual provides all necessary information about firmware updates. There is no right to be provided with binary files, so called "firmware images", those could be flashed through JTAG, SWD, Spi-Bi-Wire, SPI or similar interfaces.

15.5 Disclaimer of warranty

THE FIRMWARE IS PROVIDED "AS IS". YOU ACKNOWLEDGE THAT WÜRTH ELEKTRONIK EISOS MAKES NO REPRESENTATIONS AND WARRANTIES OF ANY KIND RELATED TO, BUT NOT LIMITED TO THE NON-INFRINGEMENT OF THIRD PARTIES' INTELLECTUAL PROPERTY RIGHTS OR THE MERCHANTABILITY OR FITNESS FOR YOUR INTENDED PURPOSE OR USAGE. WÜRTH ELEKTRONIK EISOS DOES NOT WARRANT OR REPRESENT THAT ANY LICENSE, EITHER EXPRESS OR IMPLIED, IS GRANTED UNDER ANY PATENT RIGHT, COPYRIGHT, MASK WORK RIGHT, OR OTHER INTELLECTUAL PROPERTY RIGHT RELATING TO ANY COMBINATION, MACHINE, OR PROCESS IN WHICH THE WÜRTH ELEKTRONIK EISOS’ PRODUCT WITH THE INCORPORATED FIRMWARE IS USED. INFORMATION PUBLISHED BY WÜRTH ELEKTRONIK EISOS REGARDING THIRD-PARTY PRODUCTS OR SERVICES DOES NOT CONSTITUTE A LICENSE FROM WÜRTH ELEKTRONIK EISOS TO USE SUCH PRODUCTS OR SERVICES OR A WARRANTY OR ENDORSEMENT THEREOF.
15.6 Limitation of liability

Any liability not expressly provided by Würth Elektronik eiSos shall be disclaimed. You agree to hold us harmless from any third-party claims related to your usage of the Würth Elektronik eiSos’ products with the incorporated Firmware. Würth Elektronik eiSos disclaims any liability for any alteration, development created by you or your customers as well as for any combination with other products.

15.7 Applicable law and jurisdiction

Applicable law to this license agreement shall be the laws of the Federal Republic of Germany. Any dispute, claim or controversy arising out of or relating to this license agreement shall be resolved and finally settled by the court competent for the location of Würth Elektronik eiSos’ registered office.

15.8 Severability clause

If a provision of this license agreement is or becomes invalid, unenforceable or null and void, this shall not affect the remaining provisions of the agreement. The parties shall replace any such provisions with new valid provisions that most closely approximate the purpose of the agreement.

15.9 Miscellaneous

This license agreement constitutes the entire understanding and merges all prior discussions between the parties relating to this license agreement. No ancillary verbal agreements have been made and no such agreements shall be valid. Any additions and amendments to this license agreement shall require the written form in order to be binding.

We recommend you to be updated about the status of new firmware, which is available on our website or in our data sheet, and to implement new firmware in your device where appropriate. In case only firmware is provided, we expressly exclude the automatic receipt of PCN information. Thus, new firmware will also not be provided automatically.

By ordering a wireless connectivity Product, you accept this license agreement in all terms.
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