

Onethinx Core PSoC® 6 LoRaWAN module

(v18.01)

Preliminary

1. General description

The Onethinx LoRaWAN™ Core module is a ready-to-use LoRaWAN™ module. Featuring Cypress's newest PSoC 6 and Semtech's next generation of sub-GHz radio transceiver SX1261.

The Onethinx LoRaWAN™ Core module is designed for long battery life with just 4.2 mA of active receive current consumption. The module can transmit up to +15 dBm with a highly efficient integrated power amplifier.

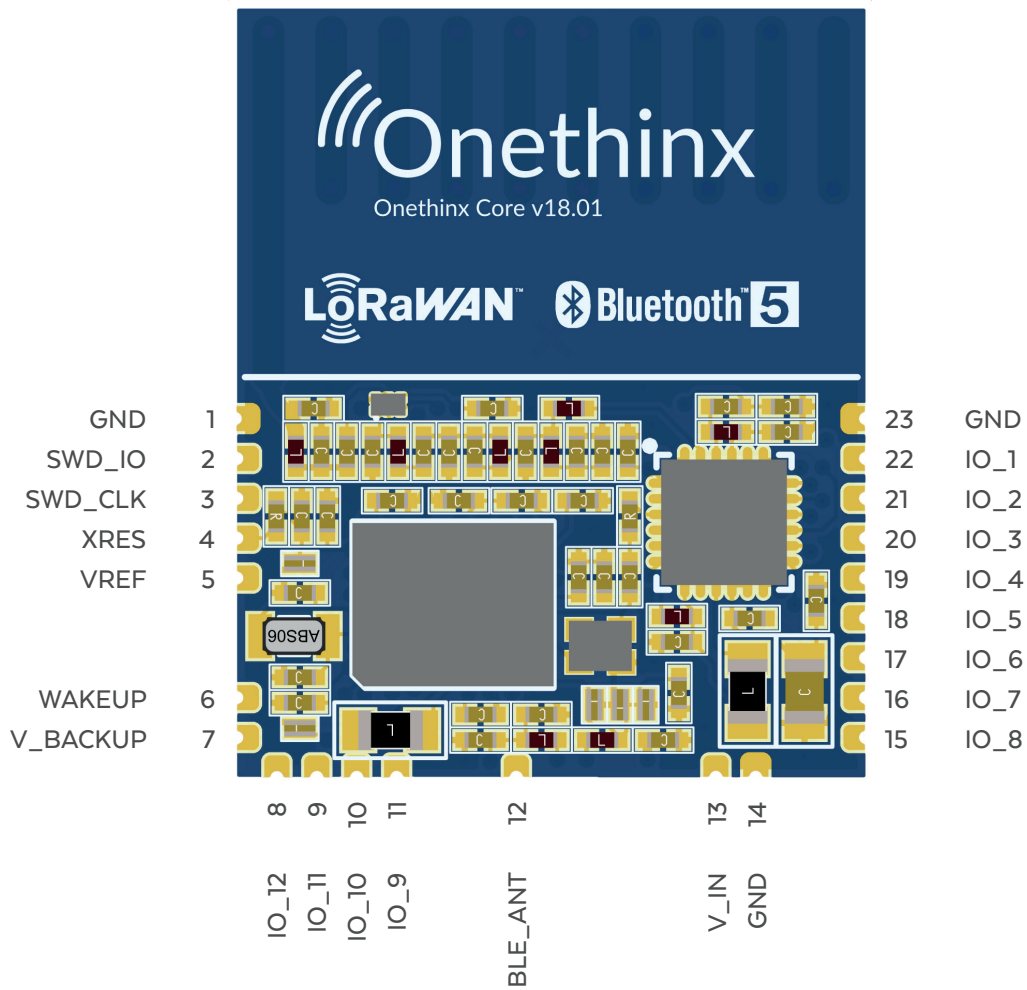
The module is developed in close cooperation with Cypress and Esccrypt, tailored to suit LoRaWAN™ projects that requires ultra-secure end-to-end encryption combined with robust LoRaWAN™ functionality. The Onethinx Core module contains our own PSoC® 6 optimized LoRaWAN™ stack for industries best performance. Due to the integrated 868/915MHz antenna and the ready implemented isolated LoRaWAN™ stack the module is ready to use 'out of the box'. The Cypress PSoC6 configurable analog and digital blocks ensures an easy and direct connection to virtually any sensor without the need of additional components.

This makes the Onethinx Core module extremely well suited for projects that require high security demands and optimal performance like public security, agriculture, leak detection, disaster precaution, gas- and water metering, street lighting applications and many more.

1.1 Features

- ✓ The only LoRaWAN™ module with latest Cypress PSoC® 6 MCU.
- ✓ Purpose-built for the IoT.
- ✓ 1st LoRaWAN™ module with embedded secure element functionality.
- ✓ Ultra secure without adding external components.
- ✓ 1st LoRaWAN™ module with dual ARM® Core processor.
- ✓ LoRaWAN™ stack runs isolated from user code for ultimate security.
- ✓ The first LoRaWAN™ module with the latest Semtech® SX126x chipset.
- ✓ Increased range at lower power.
- ✓ Smallest LoRaWAN™ module with integrated antenna.
- ✓ Eliminates radio certification at system level.
- ✓ Bluetooth® low energy (BLE) 5.0.
- ✓ Adding wireless configuration possibilities, over the air firmware upgrades.
- ✓ Recommended by Cypress®, ESCRYPT® and The Things Network®.
- ✓ Easy to connect to virtually any sensor.

2. Pinout



| Pin | Signal | Description | Pin | Signal | Description |
|-----|----------|-------------------------------------|-----|--------|--------------------------|
| 1 | GND | Ground | 13 | V_IN | Power +3.3V |
| 2 | SWD_IO | Serial Wire Debug Data / GPIO P6_6 | 14 | GND | Ground |
| 3 | SWD_CLK | Serial Wire Debug Clock / GPIO P6_7 | 15 | IO_8 | General Purpose IO P12_5 |
| 4 | XRES | Reset Input (active high) | 16 | IO_7 | General Purpose IO P12_4 |
| 5 | VREF | Analog Vref Out | 17 | IO_6 | General Purpose IO P9_2 |
| 6 | Wakeup | Wakeup input (active high) / PO_4 | 18 | IO_5 | General Purpose IO P10_3 |
| 7 | V_BACKUP | Backup power | 19 | IO_4 | General Purpose IO P9_3 |
| 8 | IO_12 | General Purpose IO P10_1 | 20 | IO_3 | General Purpose IO P10_2 |
| 9 | IO_11 | General Purpose IO P11_5 | 21 | IO_2 | General Purpose IO P9_1 |
| 10 | IO_10 | General Purpose IO P10_0 | 22 | IO_1 | General Purpose IO P9_0 |
| 11 | IO_9 | General Purpose IO P11_7 | 23 | GND | Ground |
| 12 | BLE_ANT | Bluetooth Radio RF output | | | |

3. Specifications

Absolute maximum ratings

| Parameter | Description | Min | Typ | Max | Units |
|-----------|-------------------------------|------|-----|---------|-------|
| V_IN | Supply voltage | -0.5 | | 3.7 | V |
| T.amb | Operating ambient temperature | -40 | 25 | 100 | °C |
| I.TOTAL | Total supply current | -10 | | 250 | mA |
| V.GPIO | GPIO voltage | -0.5 | | VDD+0.5 | V |
| I.GPIO | GPIO current | -25 | | 25 | mA |

Recommended operating range

| Parameter | Description | Min | Typ | Max | Units |
|-----------|-------------------------------|-----|-----|-----|-------|
| V_IN | Supply voltage | 1.9 | 3.3 | 3.6 | V |
| T.amb | Operating ambient temperature | -15 | 25 | 85 | °C |

DC specifications

| Parameter | Description | Min | Typ | Max | Units |
|-----------|-----------------------------------|---------|-----|---------|-------|
| VI.L | GPIO input voltage low threshold | 0.3*VDD | | | V |
| VI.H | GPIO input voltage high threshold | | | 0.7*VDD | V |
| VO.L | GPIO output voltage low level | | | 0.4 | V |
| VO.H | GPIO output voltage high level | VDD-0.5 | | | V |
| I.SLEEP | Sleep Current | tbd | | | nA |

LoRa specifications

| Parameter | Description | Min | Typ | Max | Units |
|-----------|---|-----|-------|--------|-------|
| RF.S.IN | RF input sensitivity (SF = 12, BW = 125KHz) | | -137 | | dBm |
| RF.P.OUT | RF output power | | +15 | | dBm |
| RF.F.O | RF frequency offset | | +/- 8 | +/- 25 | ppm |

Bluetooth specifications

| Parameter | Description | Min | Typ | Max | Units |
|-----------|---------------------------------------|-----|-----|-----|-------|
| RX.S.IN | RX sensitivity (SF = 12, BW = 125KHz) | | -95 | | dBm |
| TX.P.MAX | RF output power | | +4 | | dBm |

Physical specifications

| Parameter | Description | Value | Units |
|-----------|-------------------------|-----------------|-------|
| LxWxH | Length x Width x Height | 24.5 x 20 x 2.4 | mm |
| M | Weight | 1.35 | g |

Revision History

| Revision | Author | Date | Units |
|----------|--------|------------|--|
| A | RN | 23-12-2017 | Initial release of datasheet. |
| B | RN | 7-8-2018 | Corrected IO5 connection to P10_3. Updated Specifications. |



More info:
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