


SDI-12 Interface | RAK13010

Description Characteristics

Brand Name	Measurement unit
RAK	piece/pieces
Origin	Each pack

Compatible Brand/Model

None

Description

Description

The RAK13010 is a SDI-12 Serial Digital Interface with a speed of 1200 baud. It uses a three wire connection. The bus is bidirectional and supports a system of one master and multiple slave devices.

Features

- Supports the SDI-12 communication protocol
- Supports the 3-wire SDI-12 communication cable
- Provides the 12V supply for the SDI-12 sensors and has an option to use an external 12V supply if required
- Power Supply:VBAT and 3.3V
- UART communication
- Operating Temperature: -40° C ~ 85° C
- Size 25 × 35 × 1 mm

Mounting

The RAK13010 WisBlock SDI-12 Module can be mounted on the IO slot of the WisBlock Base board. **Figure 2** shows the mounting mechanism of the RAK13010 on a WisBlock Base module.

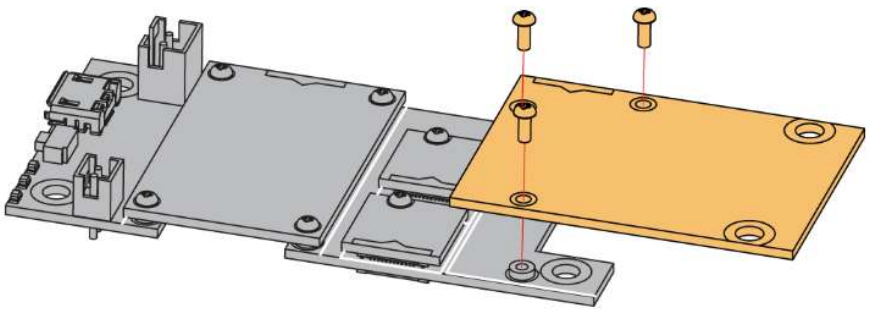


Figure 2: RAK13010 mounting mechanism on a WisBlock Base module

Pin Definition

The RAK13010 WisBlock module has a 40-pin WisConnector that is compatible with the WisBlock Base IO Slot. The pin order of the connector and the pinout definition is shown in **Figure 3**.

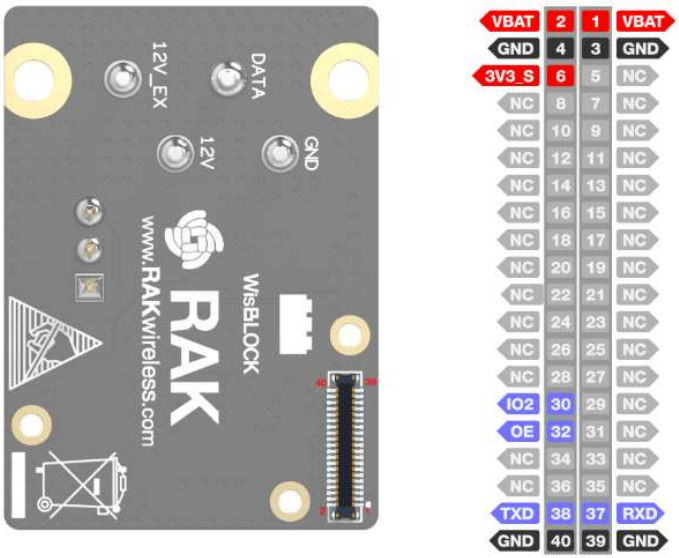


Figure 3: RAK13010 pinout diagram

NOTE

- Only **VBAT**, **3V3_S**, **IO2**, **RXD**, **TXD**, **OE**, and **GND** are connected to the WisBlock Connector.
- **3V3_S** voltage output from the WisBlock Base that powers the RAK13010 module can be controlled by the WisBlock Core via WB_IO2 (WisBlock IO2 pin). This makes the module ideal for low-power IoT projects since the WisBlock Core can disconnect the power of the RAK13010 module.

Recommended Operating Conditions

Symbol	Description	Min.	Typ.	Max.	Unit
3V3_S	3V3_S	-	3.3	-	V
VBAT	Battery	-	4.2	-	V
5V	SN74LVC1G125DBVR supply voltage	-	5	-	V
12V	Internal 12 V	-	12	-	V
12V_EX	External 12 V	-	12	-	V

Mechanical Characteristics

Board Dimensions

Figure 4 shows the mechanical dimensions of the RAK13010 module.

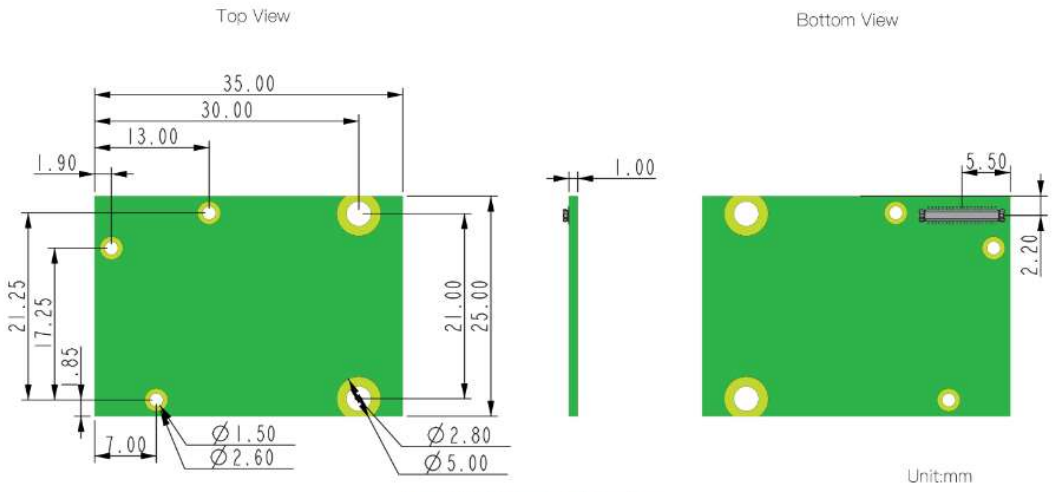
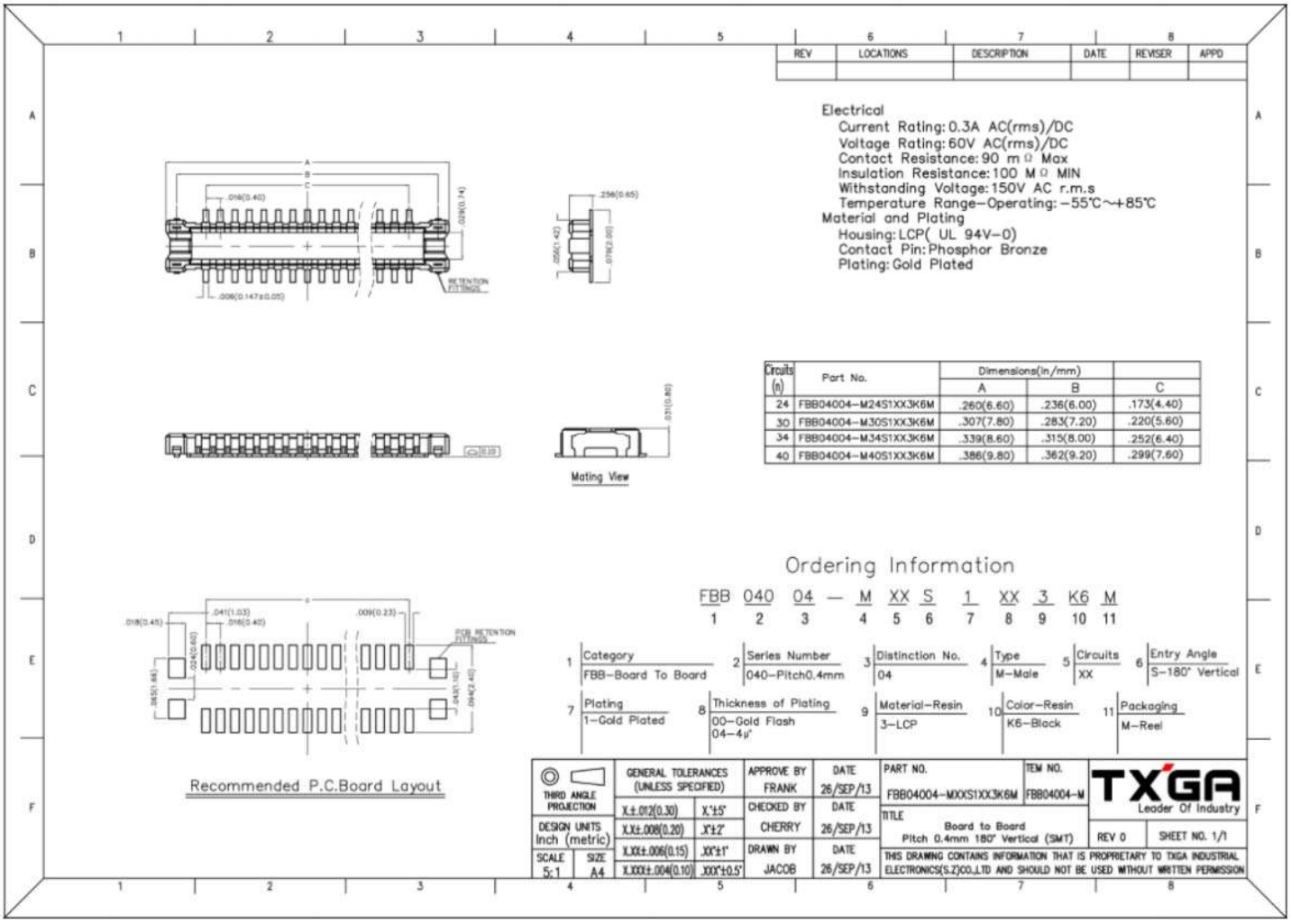


Figure 4: RAK13010 mechanical dimensions

WisBlock Connector PCB Layout



Schematic Diagram

12 V Power Supply Selection

For Internal 12 V Power Supply

- When you want to use the internal 12 V as the power supply for sensors, you need to install a jumper on pin 1 and pin 2 of J3.

For External 12 V Power Supply

- When you want to use an external 12 V as the power supply for sensors, you need to install a jumper on pin 2 and pin 3 of J3.
- Then connect the following:
  - 12 V line of external 12 V to pin 1 of J2;
  - GND line of external 12 V to pin 4 of J2.
- When using an external 12 V, the EN pin of U1 will be pulled low, so that U1 will be closed.

Conversion of SDI-12 and UART

The signal level conversion circuit interfaces a 3.3 V microcontroller with a 1200 baud UART to the SDI-12 bus. Q2 is a voltage translator, which translates the 5 V signal from the SDI bus to 3.3 V. U3 translates the 3.3 V from the UART TXD line to 5 V, and allows the microcontroller to place the line in the high impedance state when not transmitting, but de-asserting the OE line.

Figure 6 shows the timing diagram of the RAK13010 module.

- **t0**: send data to the SDI-12 data bus
- **t1**: receive data from the SDI-12 data bus

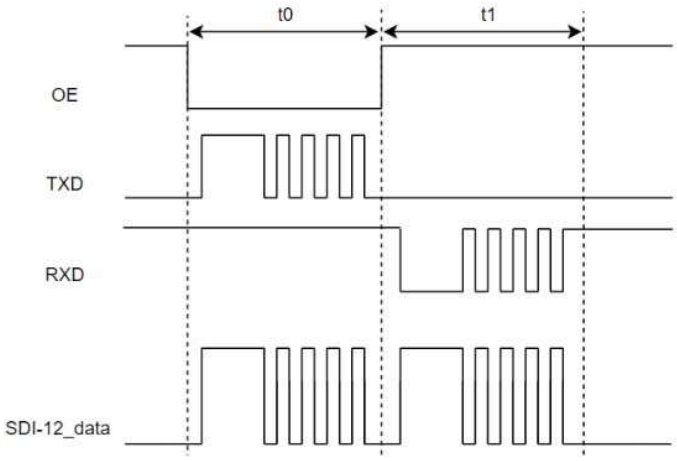


Figure 6: RAK13010 WisBlock SDI-12 Module timing diagram

Figure 7 below shows the schematic diagram of the RAK13010 module.

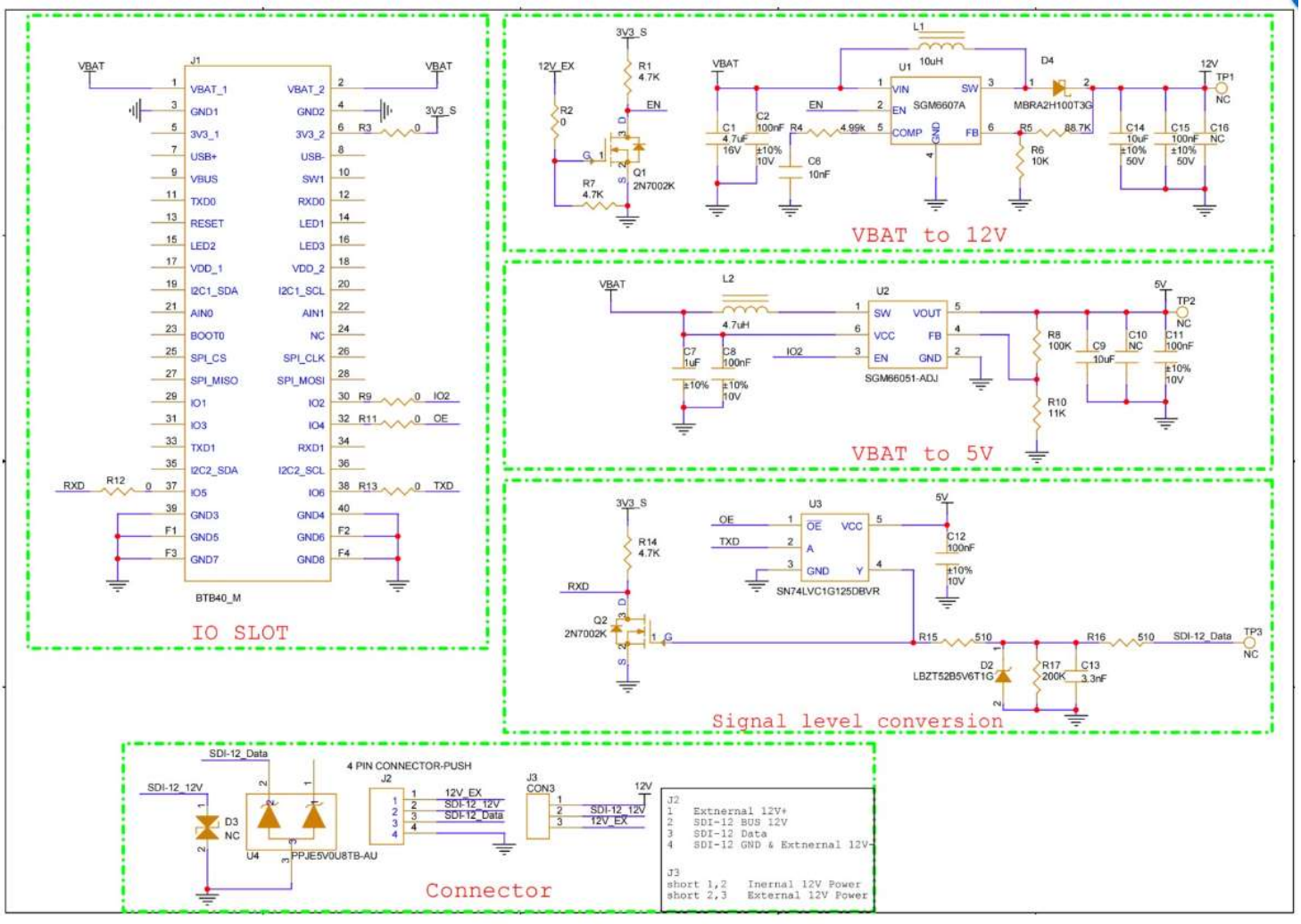
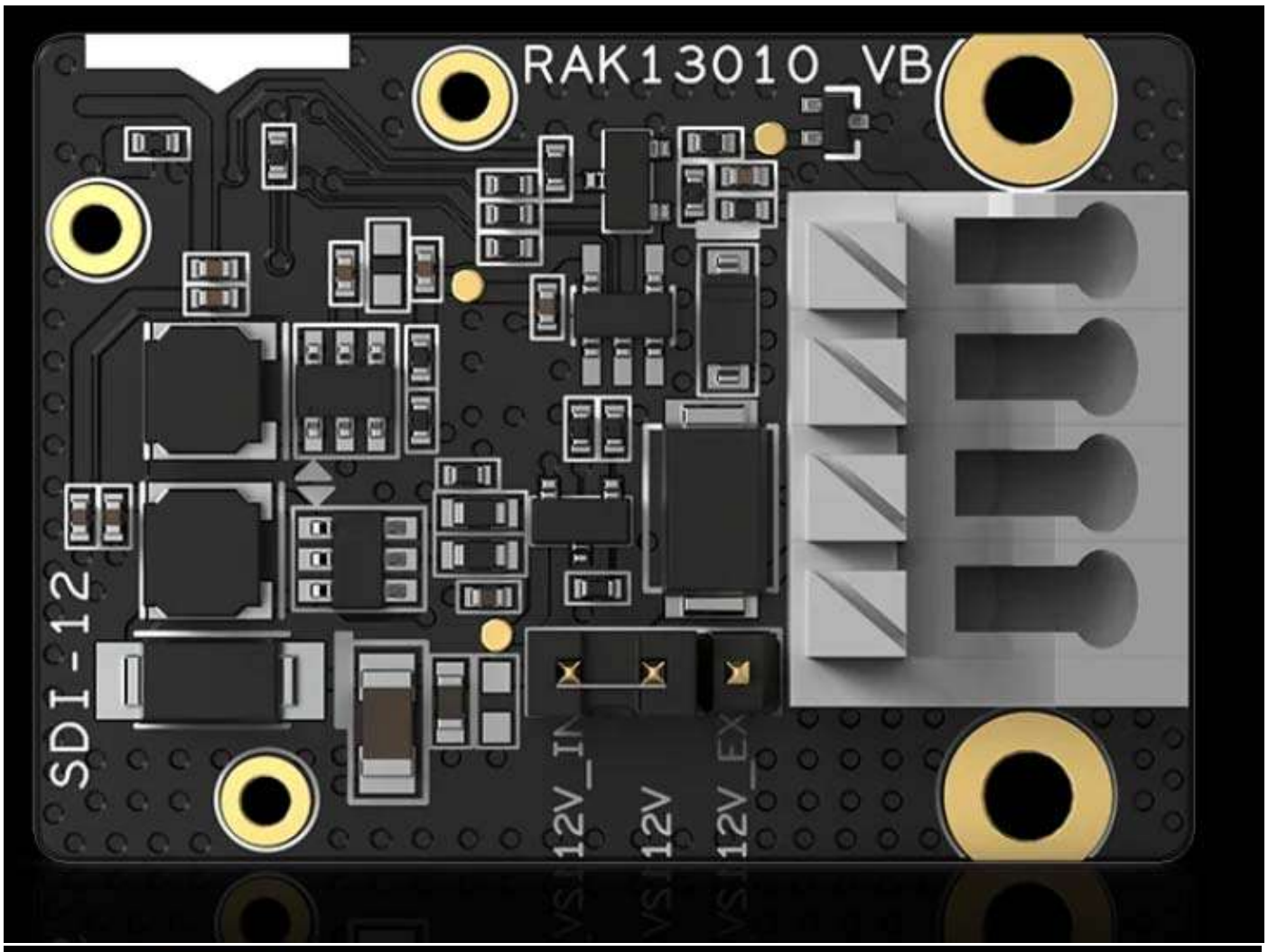


Figure 7: RAK13010 WisBlock SDI-12 Module schematic diagram


RAK13010_VB
SDI-12
12V_IN
12V
12V_EX


GND
DATA
12V
12V_EX
WisBLOCK
RAK
www.RAKwireless.com