

RAK13007 WisBlock Relay Module Datasheet

Overview

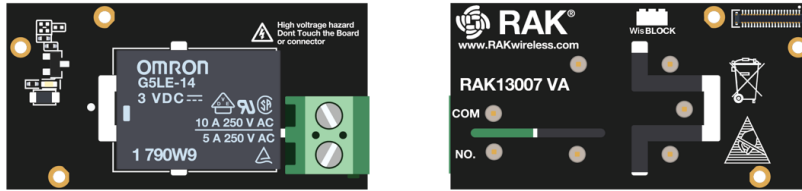


Figure 1: RAK13007 WisBlock Relay Module

Description

RAK13007 is a WisBlock Interface module that extends the WisBlock system to be used on isolated digital output applications. There is one digital output that is isolated by an electromechanical relay. The RAK13007 digital output is used to programmatically switch on/off devices operating at high voltage or high current applications.

Features

- One relay isolated output
- The isolation between internal and external signal is up to 2,500 VDC, 50/60 Hz for 1 min.
- Inductive Load: 250 V_{AC} / 5_A and 30 V_{DC} / 4_A
- Resistive Load: 150 V_{AC} / 10_A and 30 V_{DC} / 8_A
- Module size: 25 x 48 mm

Specifications

Overview

The overview covers the RAK13007 block diagram and the mounting mechanics of the board into the WisBlock Base board.

Mounting

The RAK13007 module can be mounted on the IO slot of the WisBlock Base board. **Figure 2** shows the mounting mechanism of the RAK13007 on a WisBlock Base module, such as a RAK5005-O.

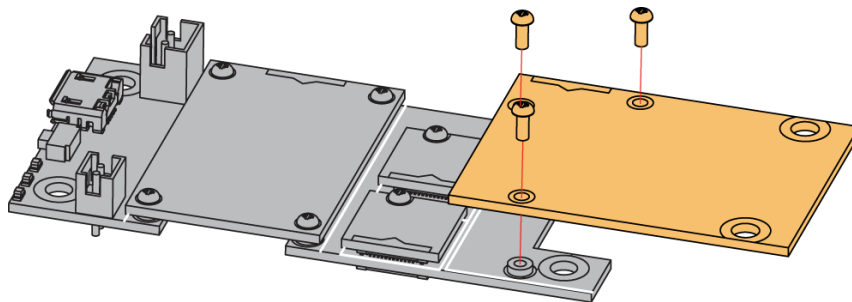


Figure 2: RAK13007 mounting mechanism on a WisBlock Base module

Block Diagram

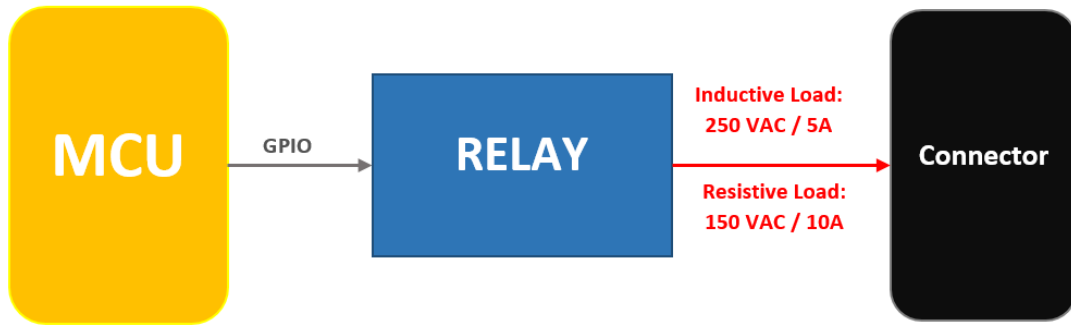


Figure 3: RAK13007 Block Diagram

The RAK13007 uses one relay to isolate the output of the MCU. The dielectric strength between coil and contacts of a relay is 2500 V_{DC}, 50/60 Hz 1min.

! WARNING!!



Never touch live parts when power is applied to the relay. Doing so may cause electrical shock. When installing, maintaining, or troubleshooting a relay (including connecting parts such as terminals and sockets), be sure that the power is turned off. You might also want to ask for a qualified electrical maintenance personnel for support.

Figure 4: Safety Precaution

Hardware

The hardware specification is categorized into four (4) parts. It discusses the pinouts and their corresponding functions and diagrams of the module. It also covers the electrical and mechanical characteristics that include the tabular data of the functionalities and standard values of the RAK13007 WisBlock Relay Module.

Pin Definition

The RAK13007 WisBlock module has a 40-pin WisConnector that is compatible to the WisBlock Base IO Slot. The pin order of the connector and the pinout definition is shown in **Figure 5**.

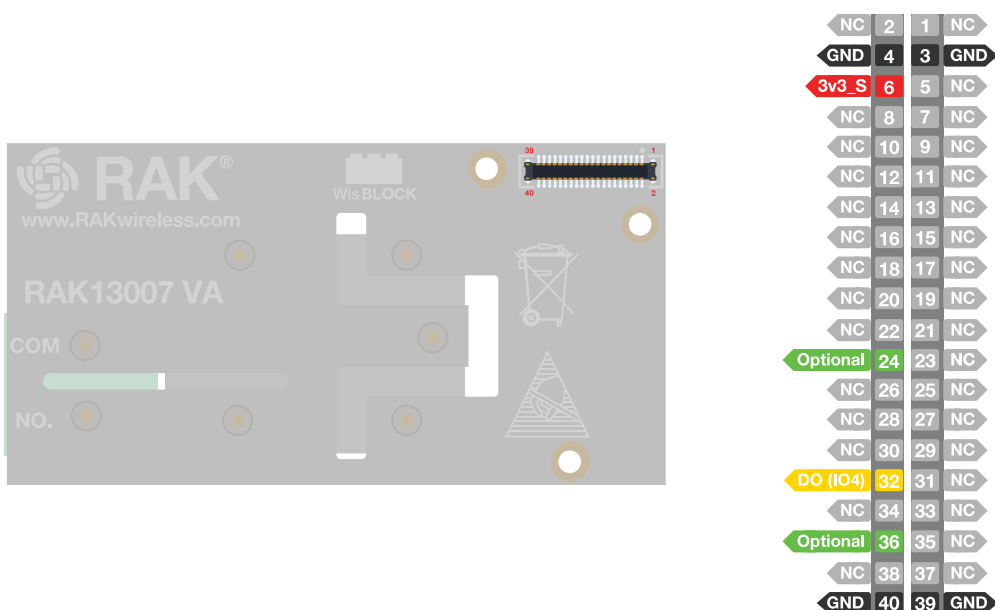


Figure 5: RAK13007 Pinout Diagram

 **NOTE**

- By default, **IO4** is used as the Digital Output (DO) pin.
- DO pin can be changed by reworking some resistors on the PCB module. There are reserved options to change the GPIO to control DO.
- **3V3_S** voltage output from the WisBlock Base that powers the RAK13007 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 totally disconnect the power of the RAK13007 module.

Electrical Characteristics

This section shows the maximum and minimum ratings of the RAK13007 module and its recommended operating conditions. Refer to the table presented below.

Recommended Operating Conditions

Description	Conditions
Contact Resistance	100 mΩ
Operate Time	10 ms max.
Release Time	5 ms max.
Bounce Time	Operate: Approx. 0.6 ms Release: Approx. 7.2 ms
Max. Switching Frequency	Mechanical: 18,0000 operations/hr Electrical: 1,8000 operations/hr at rated load
Insulation Resistance	100 MΩ min. at 500 V _{DC}
Dielectric Strength	2,000 V _{AC} , 50/60 Hz for 1 min between coil and contacts 750 V _{AC} , 50/60 Hz for 1 min between contacts of the same polarity 1,500 V _{AC} (for suffix -G) 1 min between contacts of the same polarity
Impulse Withstand Voltage	4,500 V (1.2 x 50 us) between coil and contacts
Insulation Distance	Creepage (Typ): 3.3 mm Clearance (Typ): 2.7 mm
Tracking Resistance (CTI)	250 V
Vibration Resistance	Destruction: 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) Malfunction: 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)
Shock Resistance	Destruction: 1,000 m/s ² Malfunction: 100 m/s ²

Description	Conditions
Endurance	Mechanical: 10,000,000 operations min. (at 18,000 operations/hr) Electrical: 100,000 operations min. (at 1,800 operations/hr) for standard type 36,000 operations min. (10 A at 250 V _{AC}) 100,000 operations min. (at 1,800 operations/hr), 12 A at 250 V _{AC} - applicable for G5LE-1-E, NO contact only
Ambient Temperature	Operating: -40 °C to 85 °C (with no icing)
Ambient Humidity	Operating: 5% to 85%
Weight	Approx. 12 g

Mechanical Characteristics

Board Dimensions

Figure 6 shows the mechanical dimensions of the RAK13007 module.

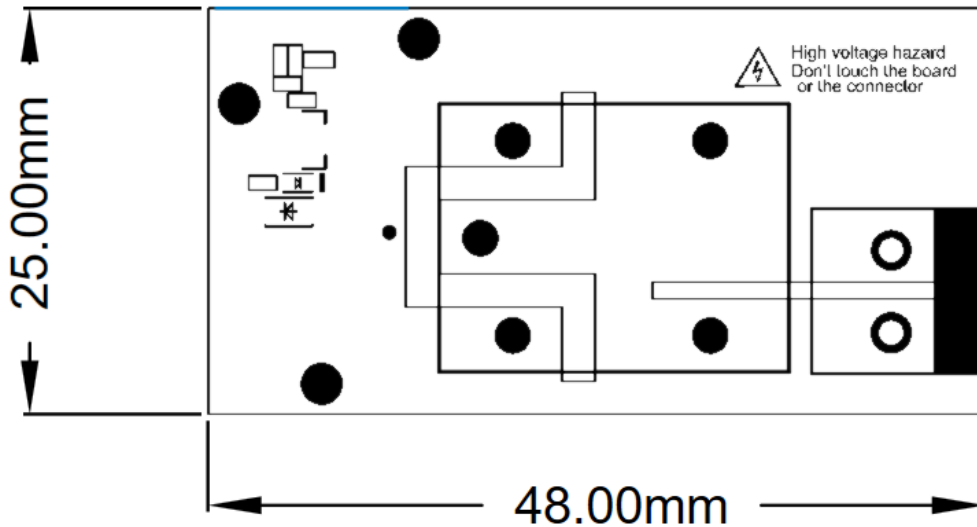


Figure 6: RAK13007 Mechanical Dimensions

WisConnector PCB Layout

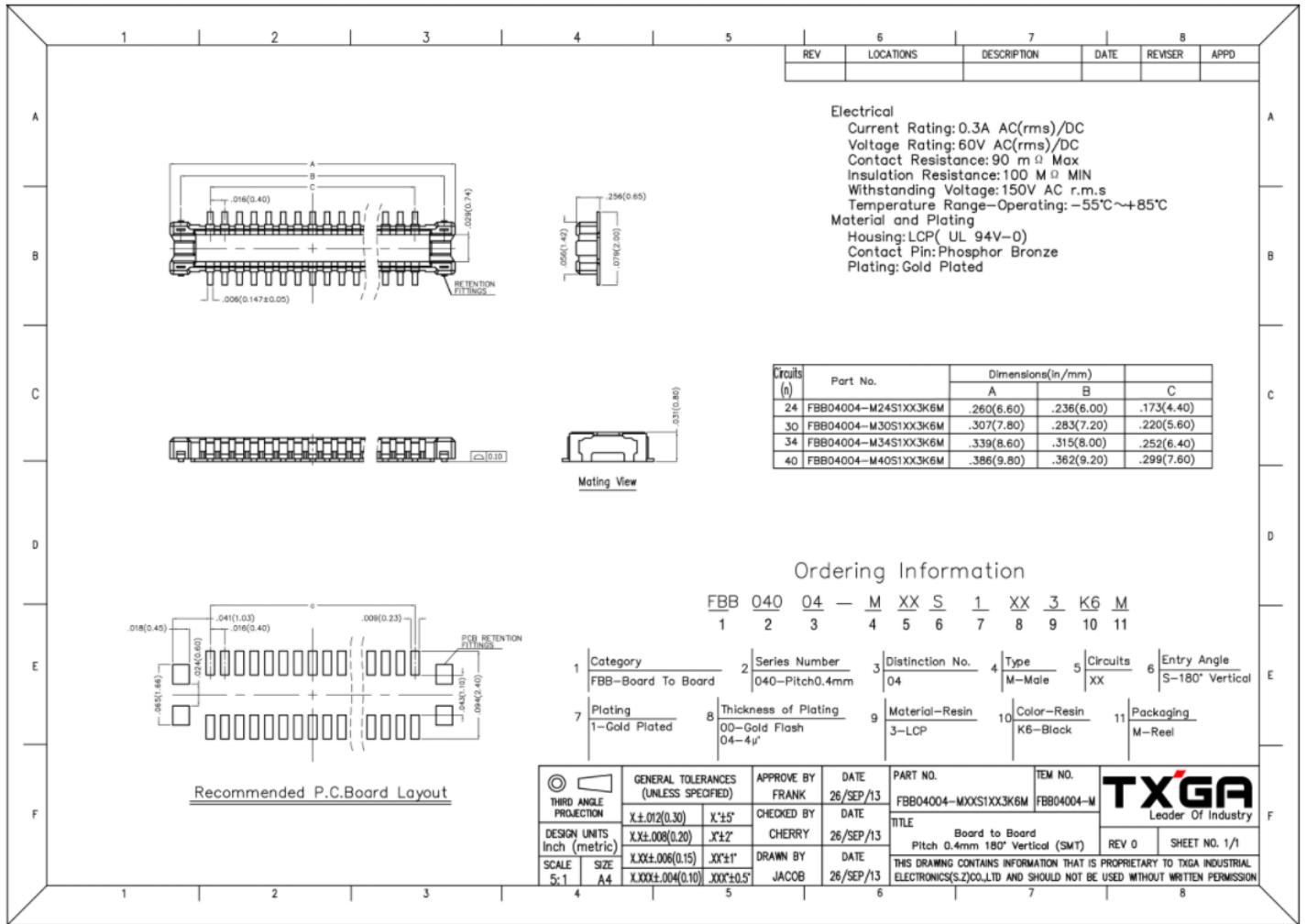


Figure 7: WisConnector PCB Footprint and Recommendations

Schematic Diagram

Figure 8 shows the schematic of the RAK13007.

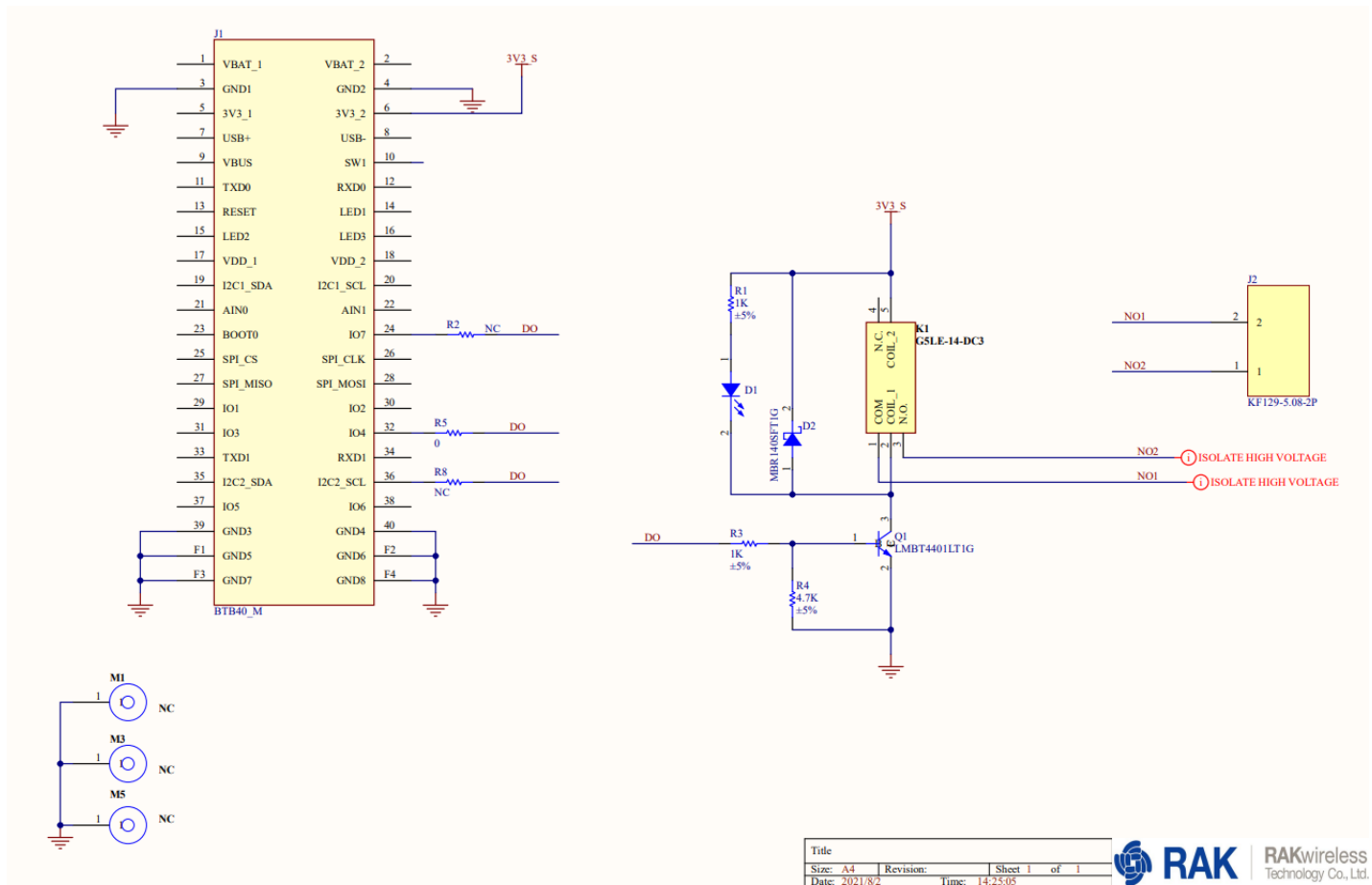


Figure 8: RAK13007 WisBlock Module Schematics

Relay Module

Figure 9 shows the schematic of the RAK13007 module. It uses 3V3_S for the relay coil power supply.

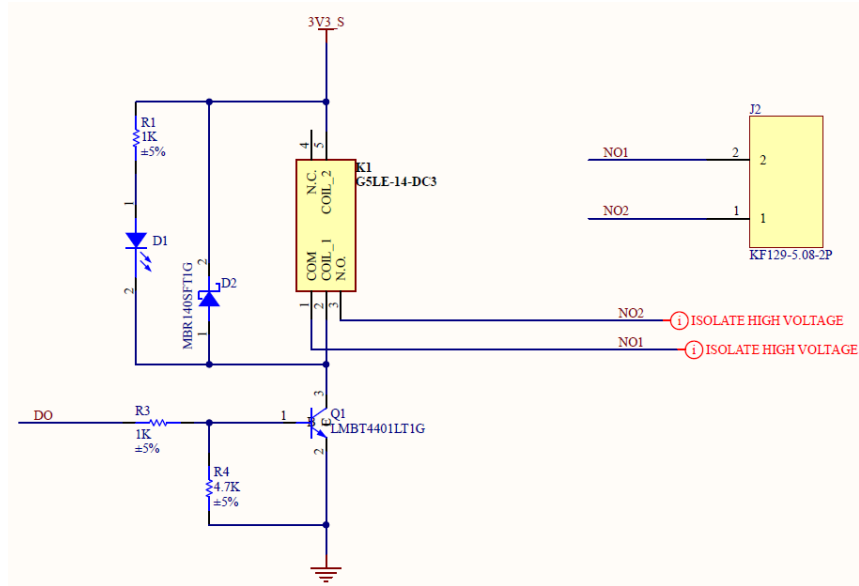


Figure 9: RAK13007 WisBlock Relay Schematic

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