

RAK13600 WisBlock NFC Module Datasheet

Overview

Description

RAK13600 is a NFC module based on PN532 chip. It provides a convenience for users, small size, low-power solution for NFC applications. The RAK13600 is a highly integrated transceiver module for contactless communication at 13.56 MHz based on the 80C51 microcontroller core. It supports 6 different operating modes:

- ISO/IEC 14443A/MIFARE Reader/Writer
- FeliCa Reader/Writer
- ISO/IEC 14443B Reader/Writer
- ISO/IEC 14443A/MIFARE Card MIFARE Classic 1K or MIFARE Classic 4K card emulation mode
- FeliCa Card emulation
- ISO/IEC 18092, ECMA 340 Peer-to-Peer

Features

- 80C51 microcontroller core with 40 KB ROM and 1 KB RAM
- Highly integrated demodulator and decoder
- Buffered output drivers to connect an antenna with minimum number of external components
- Integrated RF level detector
- Integrated data mode detector
- Supports ISO/IEC 14443A/MIFARE
- Supports ISO/IEC 14443B (Reader/Writer mode only)
- Typical operating distance in Reader/Writer mode for communication to ISO/IEC 14443A/MIFARE, ISO/IEC 14443B or FeliCa cards up to 50 mm depending on antenna size and tuning
- Typical operating distance in NFCIP-1 mode up to 50 mm depending on antenna size, tuning and power supply
- Typical operating distance in ISO/IEC 14443A/MIFARE or FeliCa card emulation mode of approximately 100 mm depending on antenna size, tuning and external field strength
- Supports MIFARE Classic 1K or MIFARE Classic 4K encryption in Reader/Writer mode and MIFARE higher transfer speed communication at 212 kbit/s and 424 kbit/s
- Supports contactless communication according to the FeliCa protocol at 212 kbit/s and 424 kbit/s
- Integrated RF interface for NFCIP-1 up to 424 kbit/s
- Possibility to communicate on the RF interface above 424 kbit/s using external analog components
- Supported host interfaces

- SPI interface
- I2C interface
- High-speed UART
- Dedicated host interrupts
- Low power modes
- Hard-Power-Down mode (1 A typical)
- 2.7 to 5.5 V power supply operating range
- Power switch for external secure companion chip
- Dedicated IO ports for external device control
- Integrated antenna detector for production tests
- ECMA 373 NFC-WI interface to connect an external secure IC

Specifications

Overview

Mounting

The RAK13600 NFC module can be mounted to the IO slot of the WisBase board. Figure 1 shows the mounting mechanism of the RAK13600 on a WisBase module, such as the RAK5005-O.

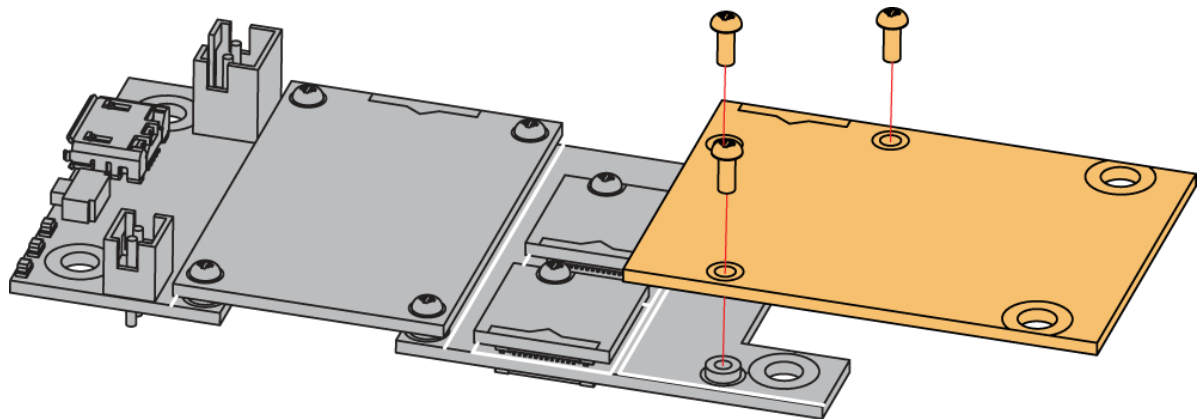


Figure 1: RAK13600 WisBlock NFC Module Mounting

Pin Definition

The RAK13600 WisBlock NFC module comprises a standard WisIO connector. The WisIO connector allows the RAK13600 module to be mounted to a WisBlock baseboard, such as RAK5005-O. The pin order of the connector and the pinout definition is shown in Figure 2.

NOTE

- The default is **I2C**, compatible SPI, UART.
- Reset function is **RESET**, **RSTPD_N**.
- PIN 38 is wake up MCU .
- **3V3_S** and **GND** Supply power to the board.

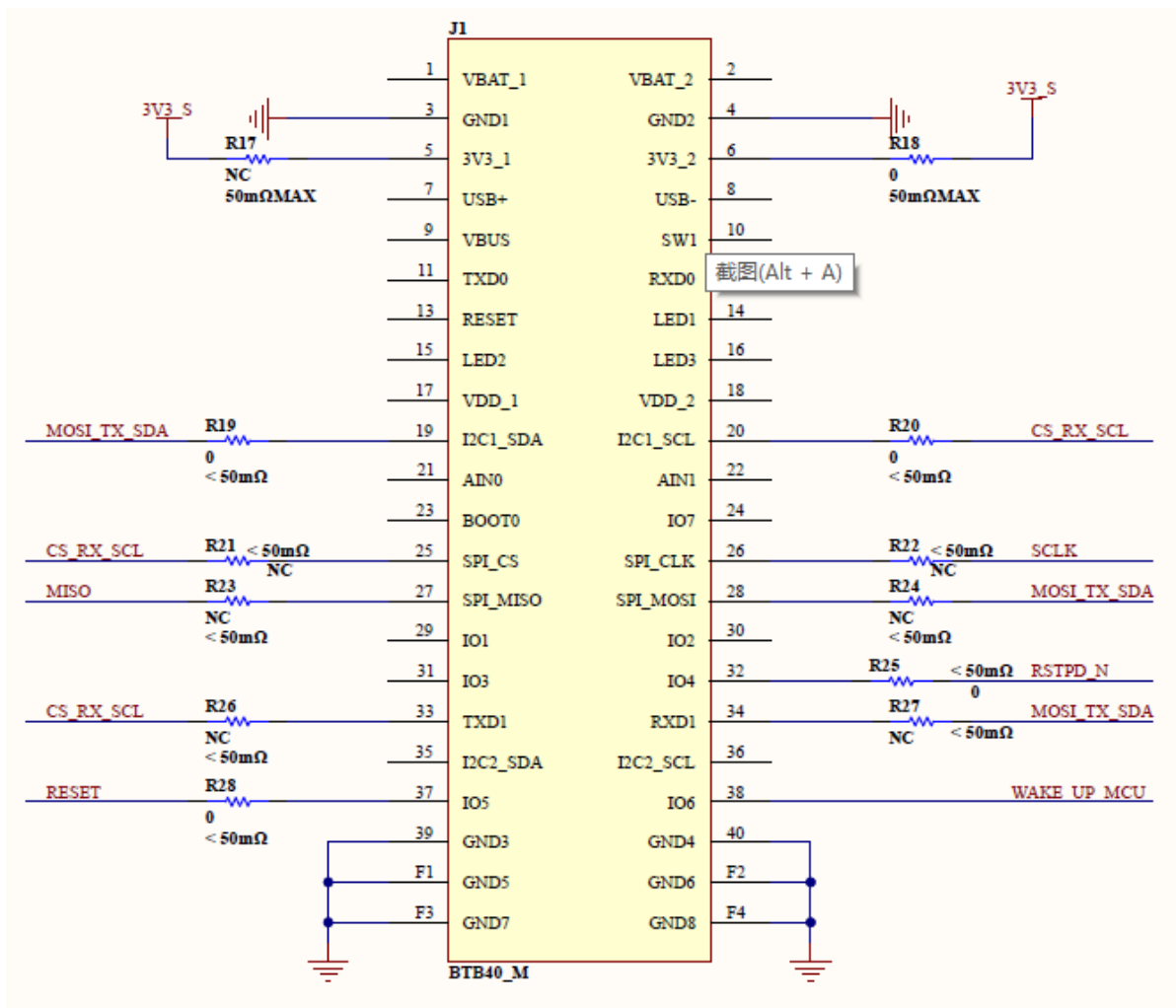


Figure 2: RAK13600 WisBlock NFC Module Pinout

Electrical Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{BAT}	battery supply voltage		2.7	-	5.5	V
ICV_{DD}	LDO output voltage	$V_{BAT} > 3.4\text{ V}$ $V_{SS} = 0\text{ V}$	[1] 2.7	3	3.4	V
PV_{DD}	Supply voltage for host interface	$V_{SS} = 0\text{ V}$	1.6	-	3.6	V
SV_{DD}	Output voltage for secure IC interface	$V_{SS} = 0\text{ V}$ (SV_{DD} Switch Enabled)	$DV_{DD} - 0.5$	-	DV_{DD}	V
I_{HPD}	Hard-Power-Down current consumption	$V_{BAT} = 5\text{ V}$	-	-	2	μA
I_{SPD}	Soft-Power-Down current consumption	$V_{BAT} = 5\text{ V}$, RF level detector on	-	-	45	μA
I_{DVDD}	Digital supply current	$V_{BAT} = 5\text{ V}$, SV_{DD} switch off	[1] -	25	-	mA
I_{SVDD}	SV_{DD} load current	$V_{BAT} = 5\text{ V}$, SV_{DD} switch on	-	-	30	mA
I_{AVDD}	Analog supply current	$V_{BAT} = 5\text{ V}$	-	6	-	mA
I_{TVDD}	Transmitter supply current	During RF transmission, $V_{BAT} = 5\text{ V}$	-	60[3]	150[4]	mA
P_{tot}	Continuous total power dissipation	$T_{amb} = -30\text{ to }+85\text{ }^{\circ}\text{C}$	[2] -	-	0.5	W
T_{amb}	ambient temperature		-30	-	+85	$^{\circ}\text{C}$

Figure 3: RAK13600 Electrical Characteristics

Mechanical Characteristics

Board Dimensions

Figure 4 shows the dimensions and the mechanic drawing of the RAK13600 module.

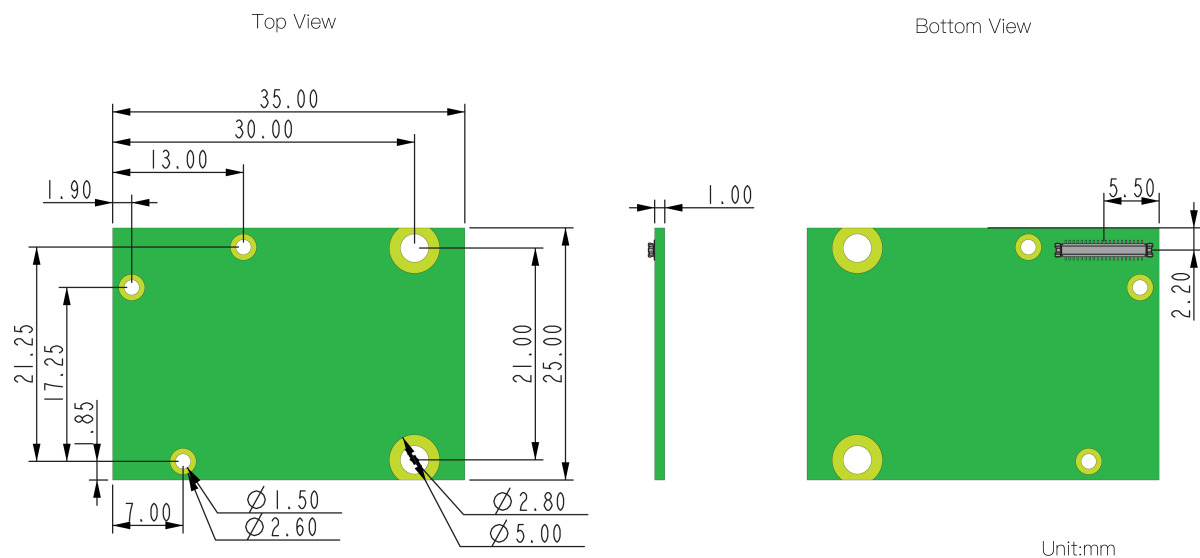


Figure 4: RAK13600 WisBlock Mechanic Drawing

WisConnector PCB Layout

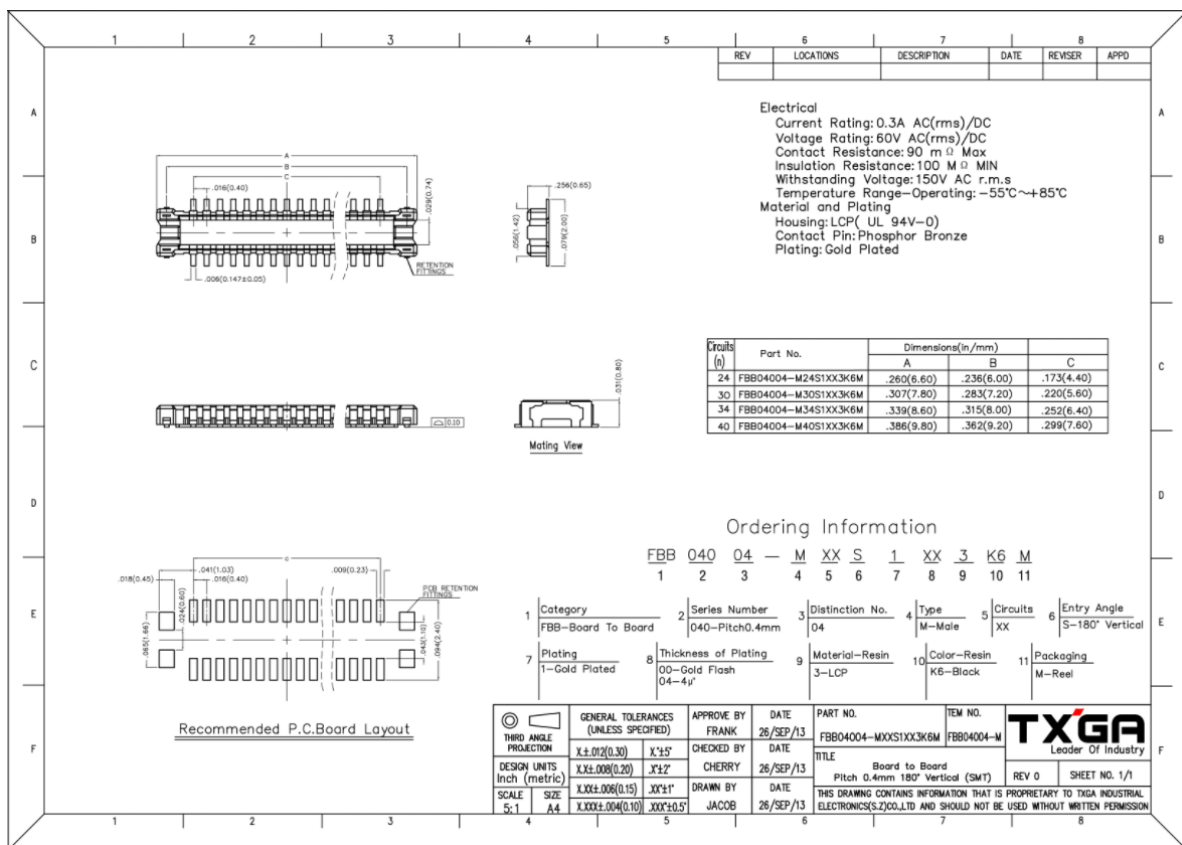


Figure 5: WisConnector PCB Footprint and Recommendations

Schematic

Connector

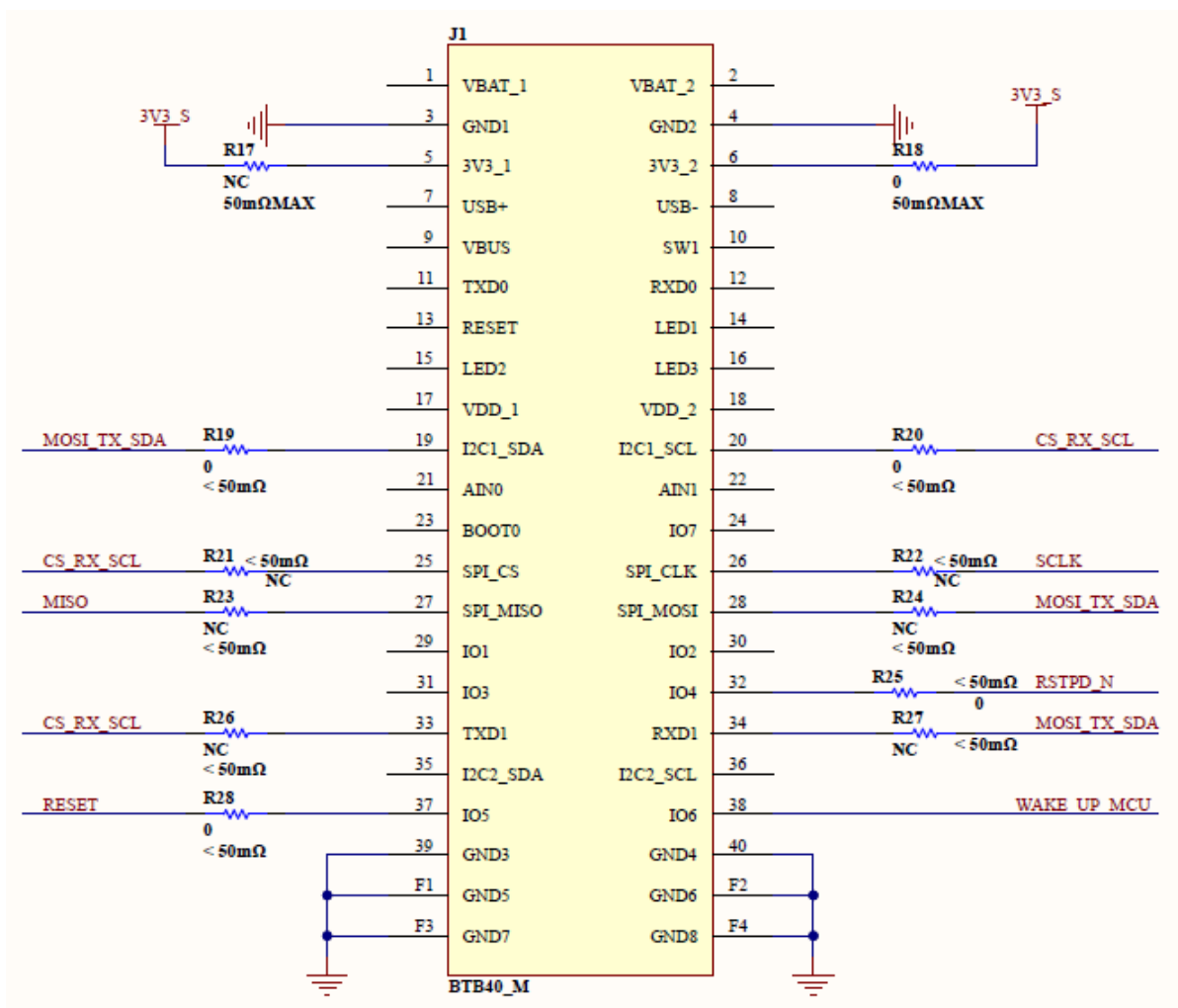


Figure 6: RAK13600 Wisblock Connector Schematic

NCF CHIP

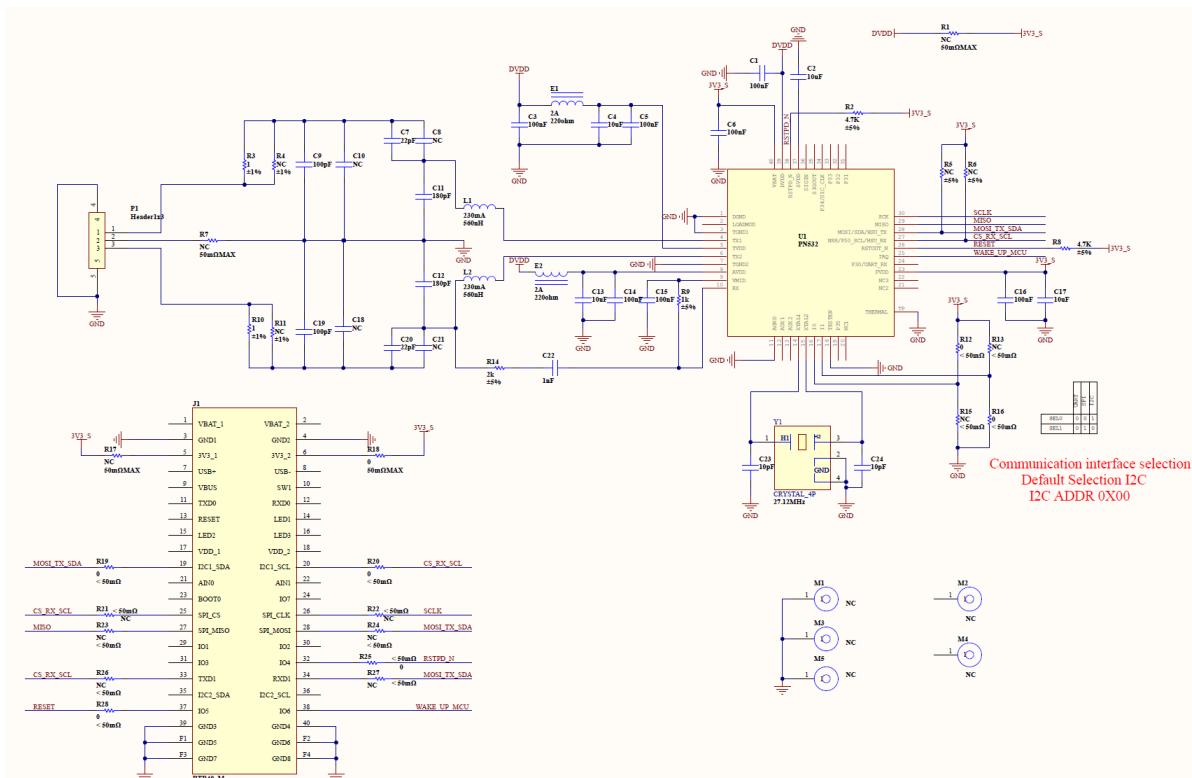


Figure 7:RAK13600 Wisblock all schematic

NFC Antenna

Figure 8 shows the NFC antenna. This is accessories and connected to port P1.

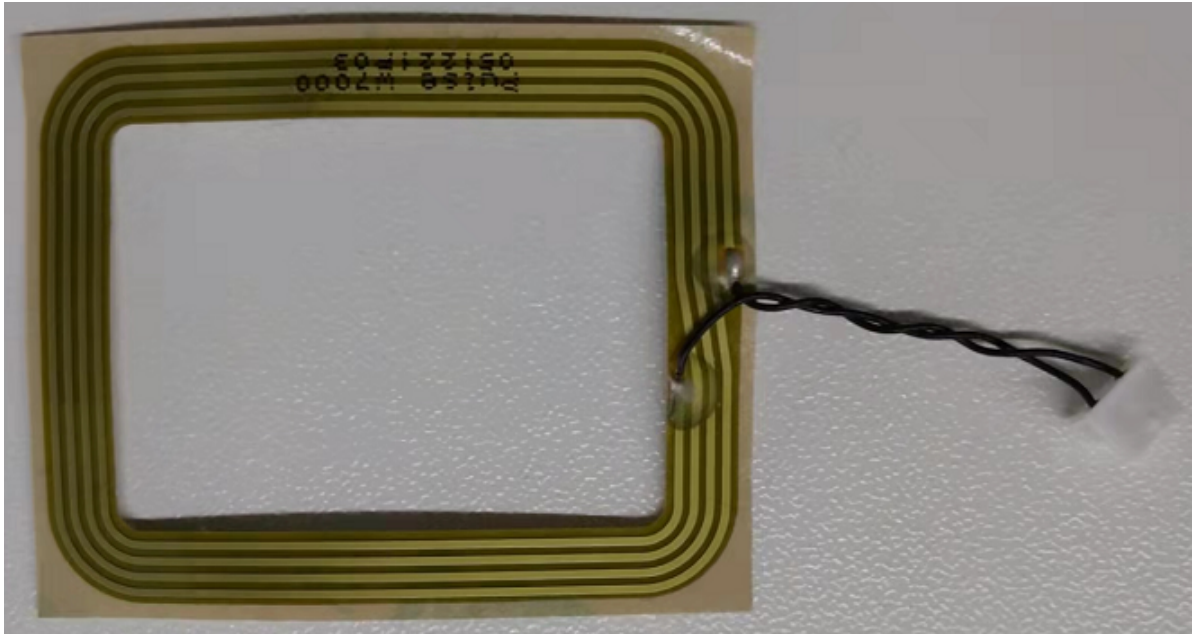


Figure 8:RAK13600 Wisblock NFC Antenna