# SKL5010

## USB2.0 contactless connectivity

## 1. Overview

SKL5010 is a pair of RF modules with integrated antenna to achieve USB2.0/UART/GPIO/I2C to 60GHz millimeter Wave RF signal conversion. The input of SKL5010 is a USB Type-c connector, with the output of centimeters distance RF transmission. SKL5010 module is based on leading edge ST60A3H1 mmW RF transceiver.

## 2. Features

- 60GHz V-Band transceiver with ST60A3H1
- For USB2.0 short range contactless connectivity up to 480 Mb/s, preferred 1cm
- Supports UART/GPIO/I2C data transfer in low-speed mode
- Half duplex, full RF transceiver and integrated antenna
- USB Type-C interface input
- Used in pairs

## 3. Application

- Contactless accessories
- Contactless personal equipment docking hub & data transfer
- Industrial Contactless Connectors
- Contactless test factory automation and after sales services

## 4. Block diagram

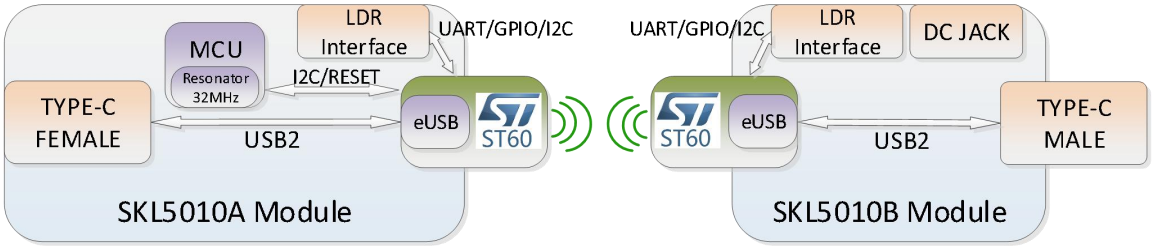



Figure 1. Schematic diagram of SKL5010

Board outlook:

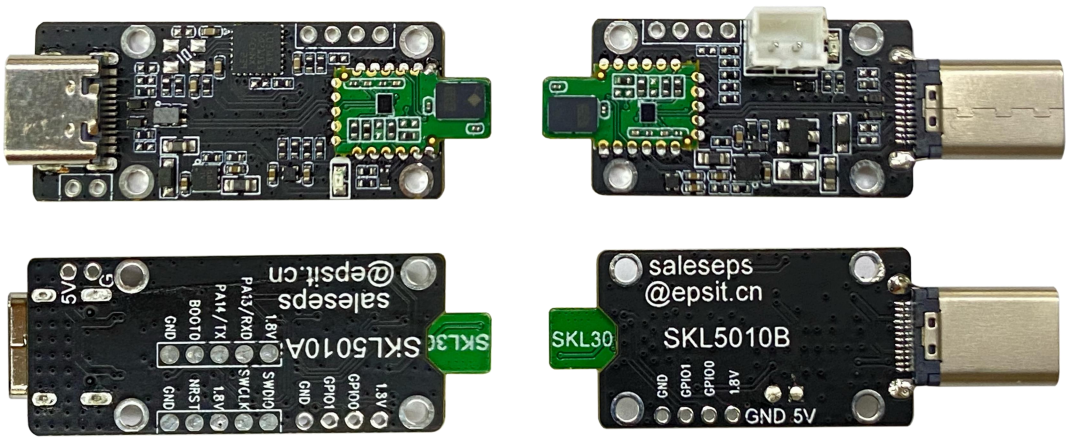
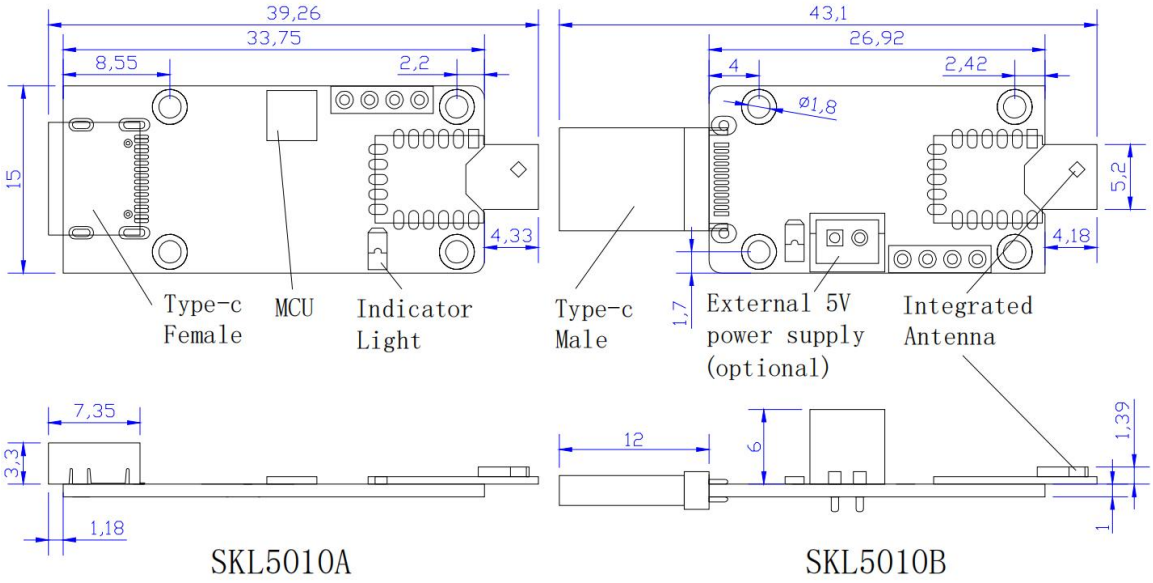



Figure 2. Board outlook of SKL5010

## 5. Assembly

PCB installation:




Unit: mm

Figure 3. Outline size of SKL5010

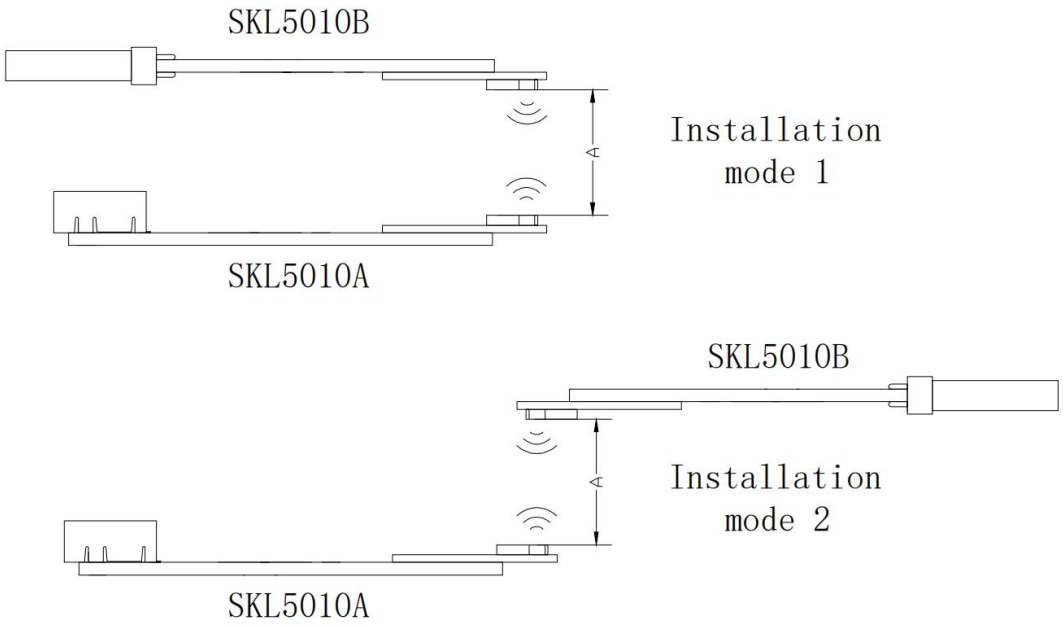



Figure 4. Board outlook of SKL5010

Note:
(1) If a metal cover is used, a window should be added for microwave signal. Plastic or other microwave insensitive materials can be used to fill the window.
(2) The SKL5010A module is in host mode, powered by USB type-c interface. The SKL5010B module is in device mode, which can be powered by the device from the USB type-c interface or externally supplied with 5V from the XH 2P interface. Please do not connect them both at the same time.
(3) Both 0° and 180° relative orientations are supported as shown in figure.
(4) It is recommended that the installation distance ('A') is typically 1 cm and the maximum is 3 cm.

## 6. Power supply

SKL5010A:

| Symbol | Description | Min | TYP | Max | Unit |
|---|---|---|---|---|---|
| $V_{IN}$ | Power supply | 4.5 | 5 | 5.5 | V |
| $C_{IN}$ | Input current(*) | - | 42 | - | mA |
| P | Total Power consumption | - | 0.21 | - | W |

SKL5010B:

| Symbol | Description | Min | TYP | Max | Unit |
|---|---|---|---|---|---|
| $V_{IN}$ | Power supply | 4.5 | 5 | 5.5 | V |
| $C_{IN}$ | Input current(*) | - | 42 | - | mA |
| P | Total Power consumption | - | 0.21 | - | W |

## 7. Temperature

| Symbol | Description | Min | TYP | Max | Unit |
|---|---|---|---|---|---|
| $T_A$ | Ambient Operating Temperature, for SKL5010A/B | -20 | - | 85 | ℃ |

## 8. Mode configuration

The ST60A3H1 chip on the SKL5010A board needs to be configured by I2C using the MCU, and the ST60A3H1 chip on the SKL5010B board is configured by over-the-air by the SKL5010A board's ST60A3H1 through Remote register access.

An I2C set of commands sent to registers of ST60A3H1 then sets the pair of ST60A3H1s into the desired tunneling mode (eUSB2, UART, GPIO or I²C) and data can be transferred.

| Tunneling mode | Tunneling | Date Rate |
|---|---|---|
| USB2.0 | USB-DP, USB-DN | ≦480 Mbit/s |
| UART | GPIO0(RX), GPIO1(TX) | ≦6 Mbit/s |
| GPIO | GPIO0(GPIO0), GPIO1(GPIO1) | ≦6 Mbit/s |
| I2C | GPIO0(SCL), GPIO1(SDA) | ≦1 Mbit/s |

## 9. Part number

| Part number | Description |
|---|---|
| SKL5010A | USB2.0 contactless connectivity, integrated antenna, Port A |
| SKL5010B | USB2.0 contactless connectivity, integrated antenna, Port B |

NOTE:

Port A: USB Type-C female connector with MCU, MCU configures tunneling mode of ST60A3H1 by I2C; host mode, connect host devices, such as computers, mobile phones, etc.

Port B: USB Type-C male connector without MCU, unable to actively configure tunnel mode, need to be configured wirelessly by ST60A3H1 of Port A; device mode, connect slave devices, such as USB flash drives, USB cameras, etc.

Revision History

| Date | Version | Changes |
|---|---|---|
| Dec 8 2023 | 1.4 | Updated Block diagram, add Mode configuration |
| Sep 25 2023 | 1.3 | Updated model name SKL5010, Update all features |
| APR 25 2022 | 1.2 | Update power supply |
| Mar 17 2022 | 1.1 | Update product pictures |
| AUG 31 2021 | 1.0 | add PCB dimension (PCB length), Removed the minimum installation distance('A') |
| AUG 23 2021 | 0.9 | First Draft |