

## User Guide

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### **N32A003F5QX\_STB Development Board Hardware User Guide**

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#### **Introduction**

The purpose of this document is to enable users to quickly familiarize themselves with the N32A003F5QX\_STB development board, understand its functions, usage instructions, and precautions, so as to conduct MCU debugging and development based on the development board.

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# **1 Hardware Development Notes**

## **1.1 Brief**

The N32A003F5QX\_STB development board is used for sample development of the 32-bit N32A003F5Q7 chip from National Technology Corporation. This document details the functions, usage instructions, and precautions of the N32A003F5QX\_STB development board.

## **1.2 Development board functions**

The main MCU chip on the development board is model N32G0003F5Q7, in a QFN20 package. The development board provides all functional interfaces for easy customer development.

### 1.3 Development board layout

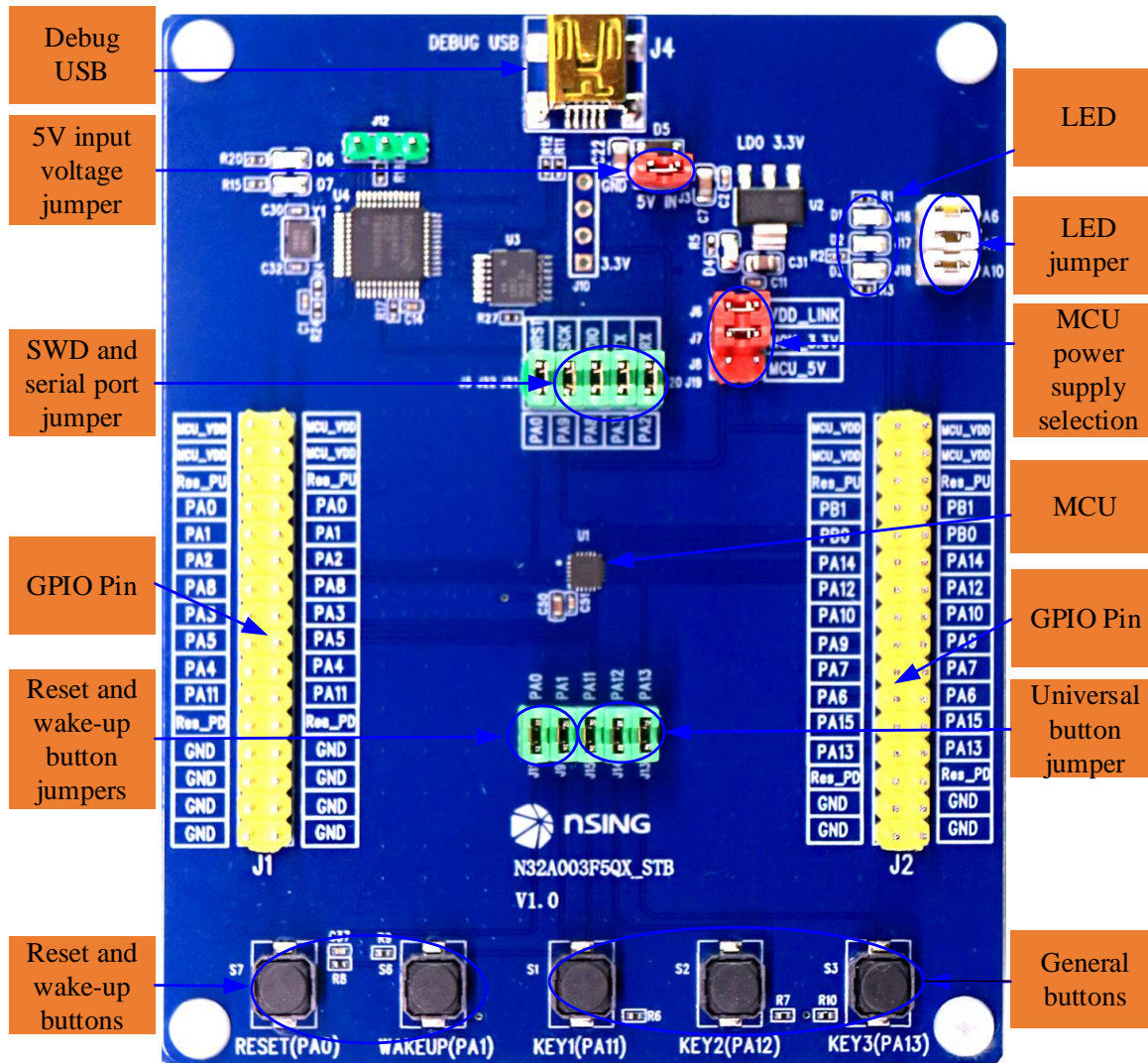


Figure 1-1 Development board layout

#### 1) Power supply for the development board

The development board can be powered via DEBUG USB (J4), which is connected to the 3.3V LDO input port via the J3 jumper.

#### 2) Debug USB (J4)

The DEBUG USB interface of the NS-LINK chip (U4) can provide the function of downloading and debugging the main MCU program, and can also be connected to the MCU's serial port to provide USB

to serial port function.

### **3) SWD and serial ports (J19 , J20 , J21 , J22 )**

SWD interface: SWDIO and SWDCK, used for downloading and debugging the main MCU program. ULINK2 or JLINK can be used to download and debug the MCU, or jumper caps can be used to short the SWDIO and SWDCK signal pins to download and debug the MCU via DEBUG USB.

Serial ports: MCU\_TX and MCU\_RX are used as external serial signals. PA2 (TX) and PA3 (RX) of the MCU are used as serial ports. They can be used to connect serial devices independently, or the MCU\_TX signal pin and MCU\_RX signal pin can be shorted with jumpers to convert the USB port to a serial port through NS-LINK on the development board for the convenience of customers.

### **4) Reset and wake-up buttons (S7, S6)**

S7 and S6 are the reset button and wake-up button, respectively, connected to the PA0 and PA1 pins of the chip, and used for chip reset and wake-up functions.

### **5) General buttons (S1, S2, S3 )**

S1, S2, and S3 are general-purpose buttons, which are connected to the PA11, PA12, and PA13 pins of the chip, respectively.

### **6) GPIO port (J1, J2)**

All GPIO interfaces of the chip are brought out, and 3.3V voltage, GND pins, 3.3V pull-up and GND pull-down pins are reserved on the pins for easy testing. For the specific definition of the interface, please refer to the "DS\_N32A003 Series Datasheet".

## 1.4 Development Board Jumper Usage Instructions

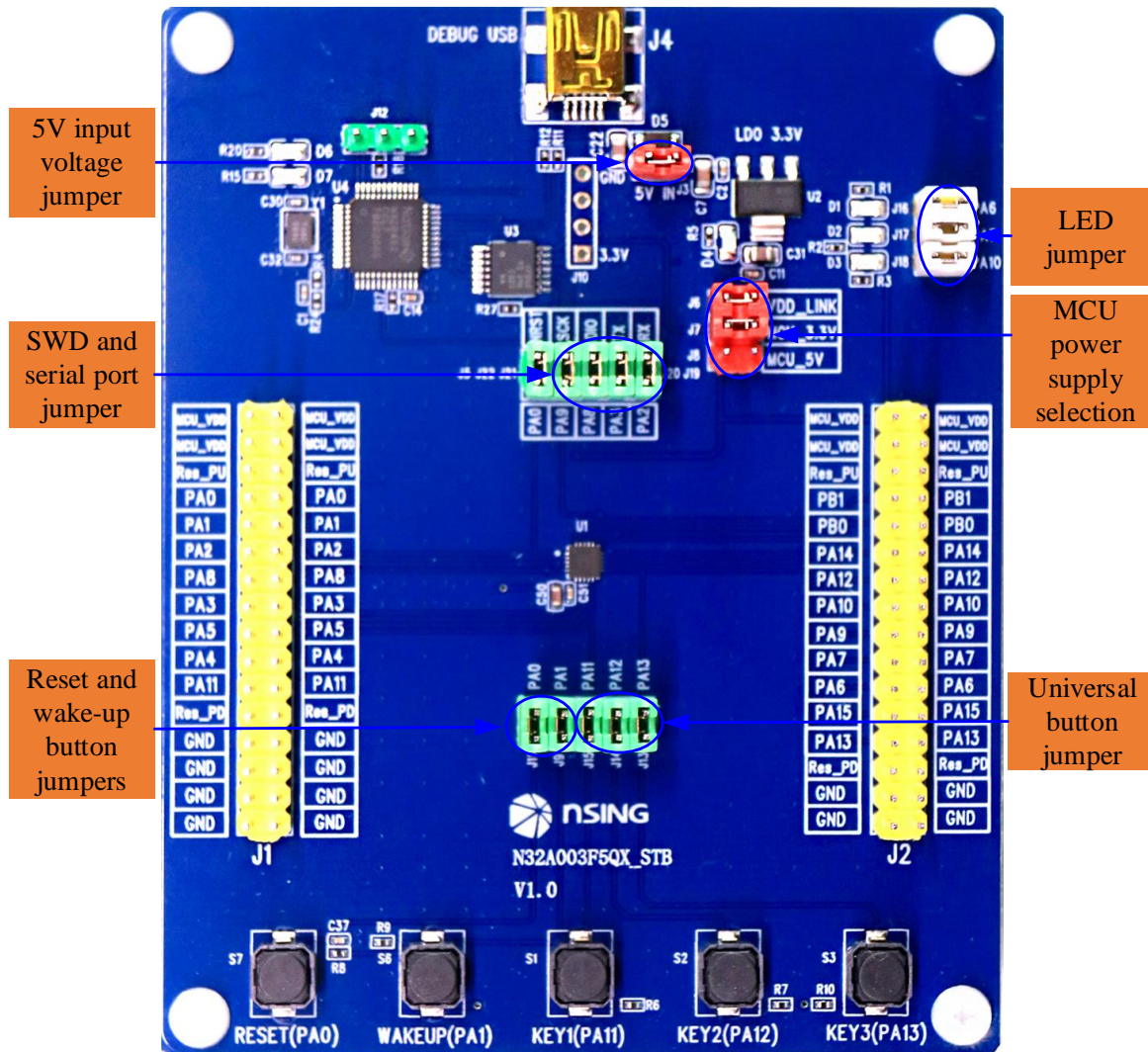


Figure 1-2 Development Board Jumper Instructions



No.	jumper position	Jumper function	Instructions for use
1	J3	5V voltage jumper	The J9 jumper is used to connect the USB interface (J4) to power the LDO 3.3V input port.
2	J6、J7、J8	MCU power supply jumper	J6: The NS-LINK MCU chip is powered by 3.3V. J7: Select 3.3V power supply for the main MCU chip. J8: Select 5V power supply for the main MCU chip.
3	J21 , J22	SWD jumper	To download a program to the MCU via the USB DEBUG port using NS-LINK, you need to short the SWDIO and SWDCK signal pins .
	J19 , J20	Serial port jumper	When using NS-LINK as a serial port via the USB DEBUG port, it is necessary to short the MCU_TX signal pin and the MCU_RX signal pin.
4	J16、J17、J18	LED jumper	The LED jumper can disconnect or connect the GPIO and the LED. J16: D1 (PA6) J17: D2 (PA7) J18: D3 (PA10)
5	J9、J11、J13、J14、J15	Button Jumper	Button jumper can disconnect the GPIO from the button. J9: WAKEUP (PA1) J11: RESET (PA0) J15: KEY1 (PA11) J14: KEY2 (PA12) J13: KEY2 (PA13) .

Table 1-1 Development Board Jumper Specifications

The schematic diagram of the N32A003F5QX\_STB development board is described below (see "N32A003F5QX\_STB\_V1.0" for details).

Referring to Figure 1-3, which shows the MCU connection schematic, the MCU VDD pin is connected to two capacitors, and all GPIO pins are led out and connected to the J1 and J2 pins for easy debugging.

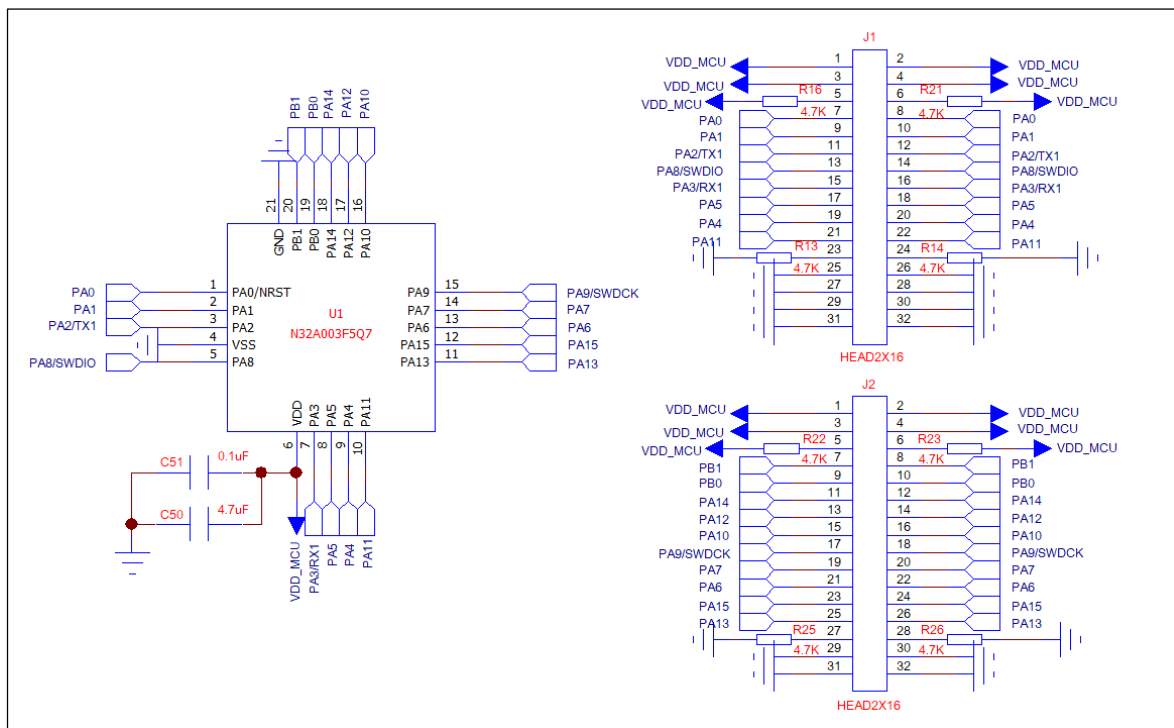


Figure 1-3 MCU connection diagram

When designing the PCB layout, place two capacitors, 4.7uF and 0.1uF, near the VDD pin.

Referring to Figure 1-4, which shows the power supply design schematic, the PCB is powered by 5V via USB, and then 3.3V is output through an LDO to power the entire PCB.



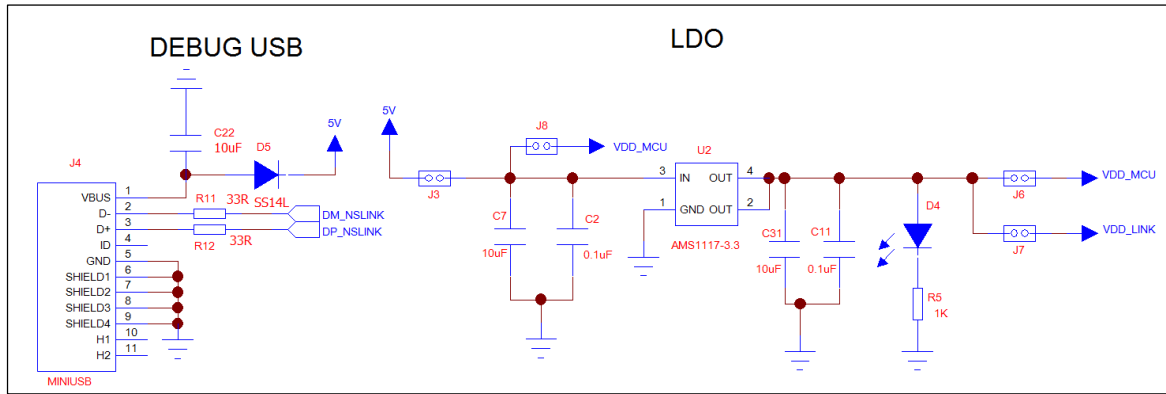


Figure 1-4 Power supply design

### 3) Button Design

Referring to Figure 1-5, which shows the button design schematic, there are a total of 5 buttons: 3 general-purpose buttons, an MCU wake-up button, and a reset button.

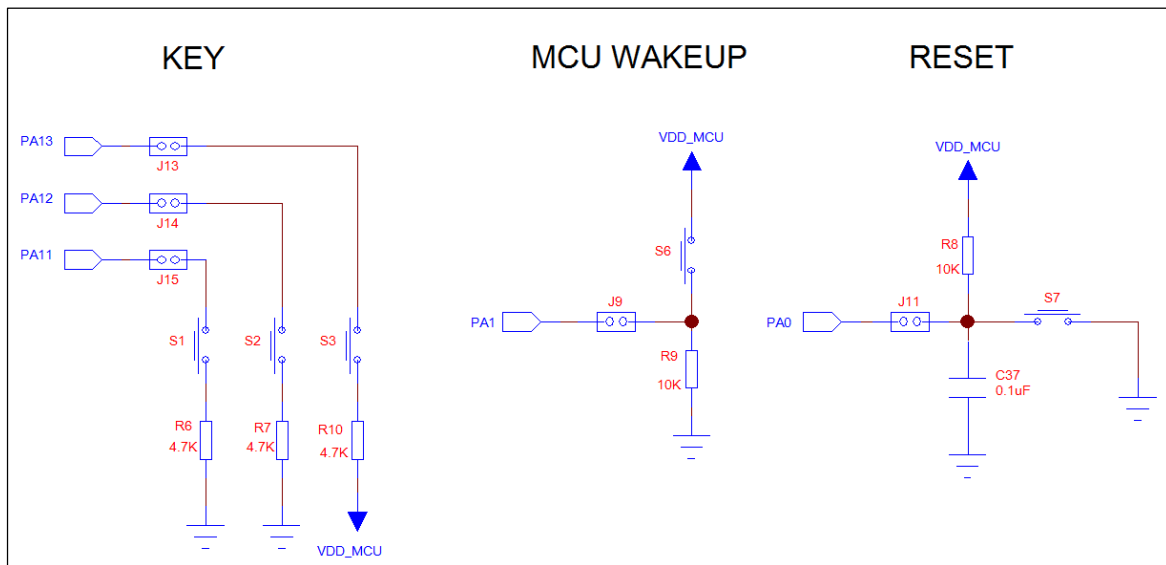


Figure 1-5 Button Design

### 4) LED lighting design

Referring to Figure 1-6, which shows the LED light design schematic, there are a total of 5 LEDs. D1, D2, and D3 are connected to PA6, PA7, and PA10 of the main MCU, respectively, and can be used for debugging. D6 and D7 are used for NS-LINK MCU control to monitor the NS-LINK's operating status.

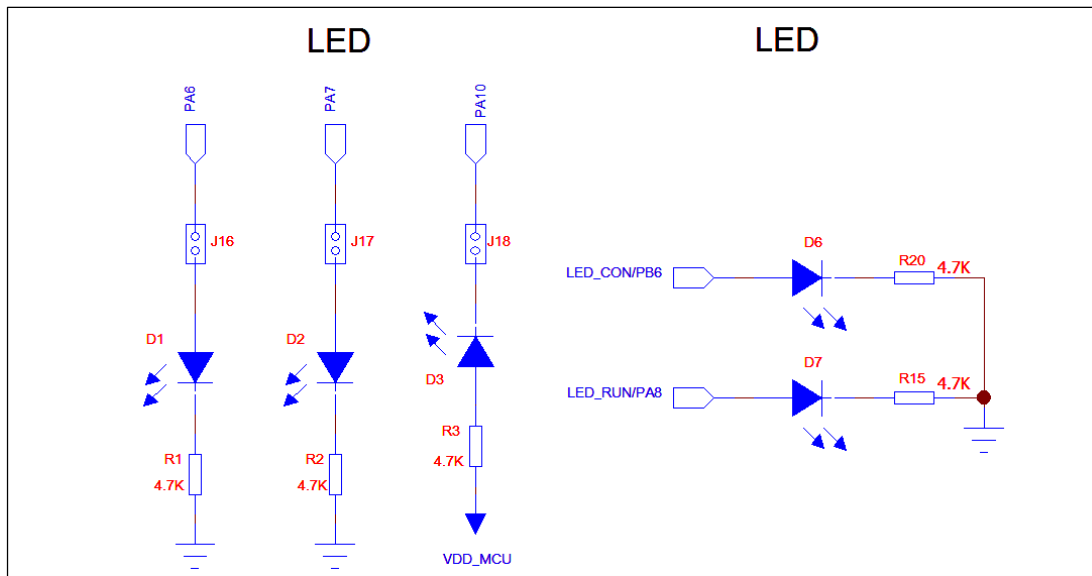


Figure 1-6 LED lighting design

## 5) NS-LINK

Referring to Figure 1-7, which shows the NS-LINK schematic, users can directly connect a USB cable via the DEBUG USB port to download programs, eliminating the need for a ULINK or JLINK programmer. Debugging can also be performed via the DEBUG USB port, which simulates a serial port.

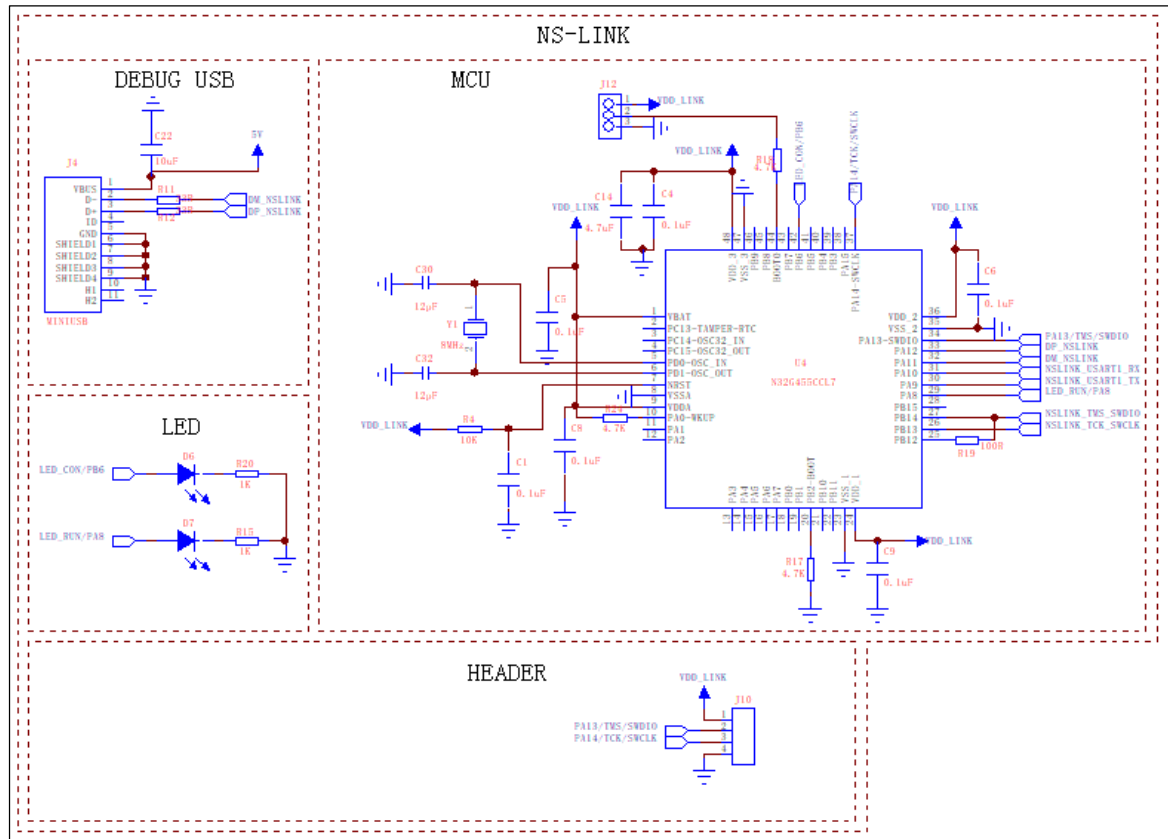


Figure 1-7 NS-LINK

## 2 Historical versions

Version	date	Remark
V1.0.0	2025-12-5	Create document

### **3 statement**

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