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SK-RF CO.,Ltd

DATASHEET

SKL5033 Module Datasheet

Contactless Industrial Ethernet Connectivity

Document Type	Product Datasheet
Applicable Product	SKL5033A / SKL5033B
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Document Summary: Describes the SKL5033 module features, interfaces, mounting dimensions, electrical characteristics, operating modes and conditions for product selection and integration.

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1 Product Overview

The SKL5033 is a contactless industrial Gigabit Ethernet module based on the ST60A2 millimeter-wave transceiver, integrating patch antennas and a Gigabit Ethernet PHY. It converts Gigabit Ethernet signals to and from 60 GHz millimeter-wave signals. An RJ45 Gigabit Ethernet input connects to a wireless link spanning a few centimeters. SKL5033 also carries 100 Mbit/s industrial Ethernet traffic, including PROFINET RT and EtherCAT.

2 Features

- 60 GHz V-band transceiver based on the ST60A2
- Short-range, contactless Gigabit Ethernet connectivity; recommended installation spacing: 2–6 cm
- Full-duplex communication with opposing antenna faces
- Selectable auto-negotiation and fixed 100 Mbit/s full-duplex modes; Fast Link Drop (FLD) fault propagation
- Fixed 100 Mbit/s full-duplex mode for use in Fast Start-Up (FSU) systems
- RJ45 Gigabit Ethernet interface
- SKL5033A and SKL5033B modules used as a matched pair

3 Applications

- Industrial production automation
- Robotic automation and control
- Contactless Ethernet applications

4 Block Diagram and Appearance



Figure 1. SKL5033 Module Block Diagram

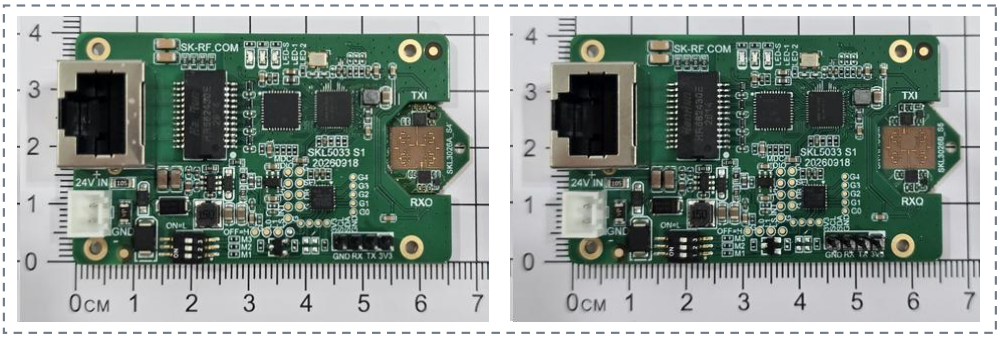


Figure 2. SKL5033A / SKL5033B Modules

5 Interface Definitions

Table 1. Interface definitions

Marking	Description
RJ45: Gigabit Ethernet Interface	
XHB2.54-2P: Power Input Connector	
VIN	Recommended supply: 5–24 V
GND	Ground

6 Mode Configuration

SKL5033 mode 111 uses auto-negotiation and automatic MDI/MDI-X. Mode 110 provides fixed 100 Mbit/s full duplex with automatic MDI/MDI-X. Modes 101 and 100 provide fixed 100 Mbit/s full duplex with fixed MDI and MDI-X, respectively; select according to the connected port's wiring configuration.

After changing the DIP switch settings, power-cycle the module to apply the new mode. Mode codes are written in the order MODE3 → MODE2 → MODE1, where OFF = 1 and ON = 0.

Table 2. Operating Modes and DIP Switch Settings

Operating Mode	Code	MODE3	MODE2	MODE1
Auto-Negotiation; automatic MDI/MDI-X	111	OFF	OFF	OFF
100 Mbit/s full duplex, automatic MDI/MDI-X	110	OFF	OFF	ON
100 Mbit/s full duplex, fixed MDI	101	OFF	ON	OFF
100 Mbit/s full duplex, fixed MDI-X	100	OFF	ON	ON
Maintenance mode; local Ethernet port disabled	000	ON	ON	ON

Note*: FLD is enabled in modes 111, 110, 101 and 100. Loss of the wireless link causes the local Ethernet port to be disconnected. Codes 001, 010 and 011 are reserved. Maintenance mode 000 does not isolate the power supply.

LED-S, LED-1 and LED-2 indicate module status:

Table 3. LED Indications

LED	Color	Description
LED-S	Blue	Steady on: normal operation. Slow flashing at approximately 1 Hz: waiting for the wireless link. Fast flashing at approximately 5 Hz: link recovery pending or PHY initialization fault.
LED-1	Green	Steady on: the local RJ45 Ethernet link is established, at any supported link speed.
LED-2	Yellow	Steady on: Gigabit link established. Off in 100 Mbit/s mode.

Note*: In maintenance mode 000, all three LEDs are off after initialization. The LEDs do not flash to indicate data activity.

7 Electrical Characteristics

Recommended operating conditions and electrical characteristics:

Table 4. Power supply and temperature parameters

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{IN}	Input voltage	4.4	24	49	V
I_{IN}	Input current*	-	34	40	mA
P	Total power consumption*	-	0.816	-	W
T_A	Operating ambient temperature	-40	-	+85	℃

Table 5. RF parameters

Symbol	Parameter	Min.	Typ.	Max.	Unit
F_{OSC}	Carrier frequency	-	60.6	-	GHz

8 Auto-Negotiation

Mode 111 supports Gigabit and 100 Mbit/s links. Each module independently negotiates with the device connected to its RJ45 port. The application system must ensure that both actual link speeds match. In fixed 100 Mbit/s mode, configure the connected device for 100 Mbps full duplex as well.

For example, if one end connects to a 100 Mbit/s industrial device, configure the computer or switch at the other end for a matching 100 Mbit/s link. Configure IP addresses, device names and application parameters in the end devices or controller project.

9 Fast Start-Up (FSU)

For PROFINET Fast Start-Up, use fixed 100 Mbps full-duplex settings coordinated with the controller and I/O device port settings. Modes 101 and 100 provide fixed MDI and MDI-X configurations, respectively, eliminating auto-negotiation and automatic crossover detection. The time required for the application to become operational depends on the complete system.

Fixed MDI/MDI-X modes do not perform automatic crossover detection. Select the mode according to the MDI/MDI-X configuration of the connected port, and use a suitable straight-through or crossover cable. Mode 110 retains automatic MDI/MDI-X crossover and must be distinguished from the fixed MDI/MDI-X modes.

Note*: FSU requires support from the controller, I/O devices, ports and project configuration. Suitability for IRT, precision synchronization and functional safety applications must be assessed separately.

10 Fast Link Drop (FLD)

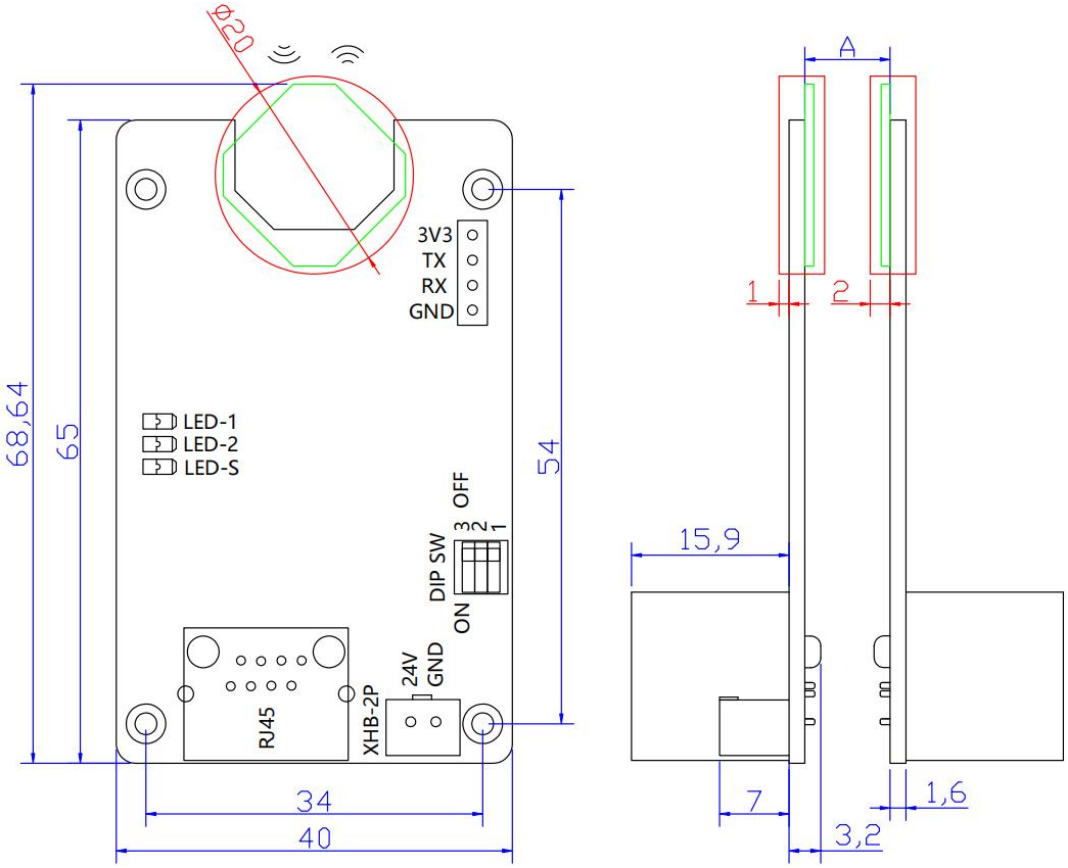
Fast Link Drop (FLD) is enabled in modes 111, 110, 101 and 100. When loss of the wireless link is detected, the module actively disconnects the local RJ45 link, propagating the wireless fault as a Link Down condition that the connected device can detect.

When the wireless link recovers, the module automatically attempts to re-establish the Ethernet link. PLC alarm clearance, slave device reconnection and I/O recovery depend on the controller, end devices and project configuration.

Note*: FLD propagates link faults; it does not provide retransmission of packets lost over the wireless link or guarantee uninterrupted operation. Link drop response, Ethernet link establishment and application recovery must be evaluated separately.

11 Assembly Instructions

PCBA mounting dimensions:



Dimensions shown in blue are in mm.

Figure 3. SKL5033 PCBA Mounting Dimensions

Notes:

(1) The cyan area indicates the antenna module; the red area indicates the antenna keep-out zone. Keep mounting structures clear of the red zone. Metal parts must not obstruct or extend into this area.

(2) Recommended installation spacing A is 2–6 cm (20–60 mm). Avoid placing the modules too close together or too far apart. Align the antennas correctly and maintain an unobstructed wireless path. The stated module transmission-distance range is 1–8 cm.

(3) When using a metal enclosure, provide a millimeter-wave RF window at the antenna keep-out zone. Select the window material and mounting structure so that they do not impair the wireless link.

12 Product Model

Table 6. Product models

Product Models	Description
SKL5033A	Contactless industrial Gigabit Ethernet module incorporating an SKL3026A millimeter-wave wireless unit.
SKL5033B	Contactless industrial Gigabit Ethernet module incorporating an SKL3026B millimeter-wave wireless unit.

13 Revision History

Date	Revision	Description of Changes
2026-11-02	V1.0	Initial Chinese edition; first formal release of the SKL5033 datasheet.
2026-11-03	V1.1	(1) Standardized the cover, document summary, contents, captions, revision history, terminology and body-table layout. (2) Separated power/temperature and carrier-frequency parameters; standardized input-current notation and subscripts, assembly instructions and figure/table references. (3) Retained the model-specific interfaces, modes, LED indications, auto-negotiation, fast start-up and fast link drop descriptions; checked internal navigation. (4) Equalized the Min., Typ. and Max. columns while retaining all values, conditions, units, font sizes and standard row spacing. (5) Unified the chapter names and outline with the reviewed product-document structure, retained product-specific functions and operating instructions, and updated the contents, figure/table numbering and internal references. (6) Moved Assembly Instructions immediately before Product Models and updated chapter numbers, figure/table numbering, contents and internal references. (7) Refined the product overview to integrate the chipset platform naturally into the module, antenna and functional descriptions, retaining model-specific capabilities, pairing requirements and parameters. (8) Standardized chapter names, order and content allocation using the common outline, retaining technical descriptions and illustrations; updated the contents, figure/table numbering and internal references. (9) Prepared and checked this English edition against the current Chinese edition, preserving numbered items, parameters, illustrations, commands and operating instructions.