千问办公

PRODUCT SPECIFICATION

SM-10 Laser Ranging Sensor Module

3-Axis Sensing + iToF Laser Ranging · UART Digital Output · V1.0

Hejiarun Electronic Technology Co., Ltd. September 2026

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

Document Information

Item	Content
Document Title	SM-10 Laser Ranging Sensor Module Product Specification
Document No.	SPEC-SM10-2026-001
Version	V1.0
Release Date	2026-09-16
Classification	Internal / Controlled — Customer Delivery
Prepared by	Product Dept., Hejiarun Electronic Technology Co., Ltd.

Yellow-Highlight Notice

Amber-highlighted text in this document indicates reference values pre-filled based on typical industry practice. They have not been verified by measurement and must be confirmed and replaced with actual test data before formal release or external delivery.

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

Table of Contents

CONTENTS

Document Information

Table of Contents

1. Product Overview
   - 1.1 Introduction
   - 1.2 Positioning
   - 1.3 Highlights
2. Mechanical and Structural Specifications
   - 2.1 Product Photo
   - 2.2 PCB Layout
   - 2.3 Mechanical Parameters
   - 2.4 Component Layout
3. Interface Definition
   - 3.1 External Pads (Bottom)
   - 3.2 U2 Connector Pins
4. Functional Specifications
5. Technical Specifications
   - 5.1 Electrical Characteristics
   - 5.2 Laser Ranging Performance
   - 5.3 3-Axis Sensor Performance
   - 5.4 Environmental Conditions
   - 5.5 UART Communication Parameters
6. Communication Protocol
   - 6.1 Data Frame Format (Example)
   - 6.2 Typical Communication Flow
7. Reliability and Testing
8. Safety and Certifications
9. Packaging and Delivery
10. Appendix
    - Appendix A: Terms and Abbreviations
    - Appendix B: Contact

1. Product Overview

1.1 Introduction

The SM-10 is a compact laser ranging sensor module from Hejiarun Electronic Technology Co., Ltd. It integrates an **iToF (indirect Time-of-Flight) laser ranging sensor** and a **3-axis sensor** on board, simultaneously outputting target distance and attitude/angle data. The module communicates with a host MCU via UART (TXD/RXD) and is powered from a single 3.3 V supply.

The laser ranging covers 2 m to 5 m with sub-millimeter accuracy (maximum error ⩽ ±1 mm over the full range). Combined with the 3-axis sensor, horizontal angle measurement is supported. The module is well suited to smart furniture, robot vacuums, security surveillance, industrial positioning, and liquid/bulk level detection, and is easy to integrate into smart hardware and IoT devices.

1.2 Positioning

- **Target markets**: Smart home, service robots, security surveillance, industrial positioning, IoT devices
- **Target customers**: OEMs, solution providers, system integrators
- **Core value**: Millimeter-class ranging plus angle sensing — compact size, plug-and-play serial interface, easy SMT integration

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

1.3 Highlights

Feature	Description
iToF laser ranging	Range 2 – 5 m, sub-millimeter accuracy, max error ⩽ ±1 mm over full range
3-axis sensing	On-board 3-axis sensor supporting horizontal angle measurement (see Section 5.3)
Ultra-compact	Only 10.474 mm × 13.078 mm, saves enclosure space
Standard serial	UART (TXD/RXD), 3.3 V level, easy to connect
Single supply	3.3 V power, no multiple rails required
High integration	On-board MCU and RC filtering; only power and serial lines required externally
Mounting holes	Corner mounting holes for screws or SMT assembly

2. Mechanical and Structural Specifications

2.1 Product Photo

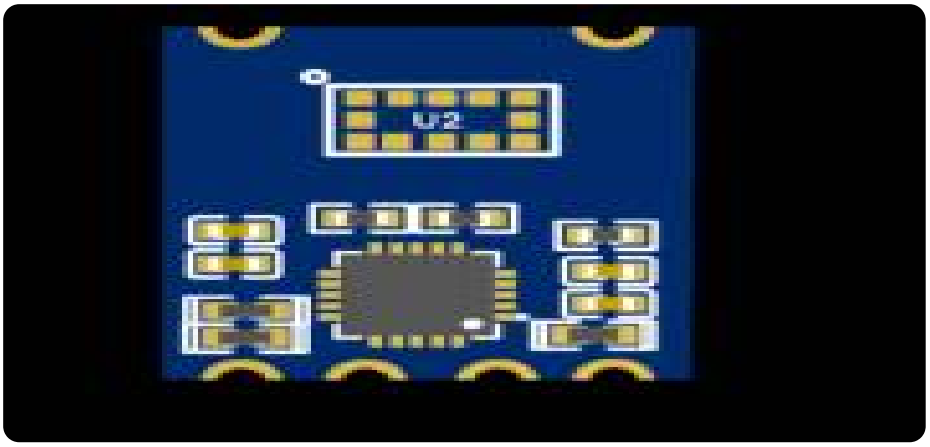


Figure 2-1 SM-10 module photo (top side)

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

2.2 PCB Layout

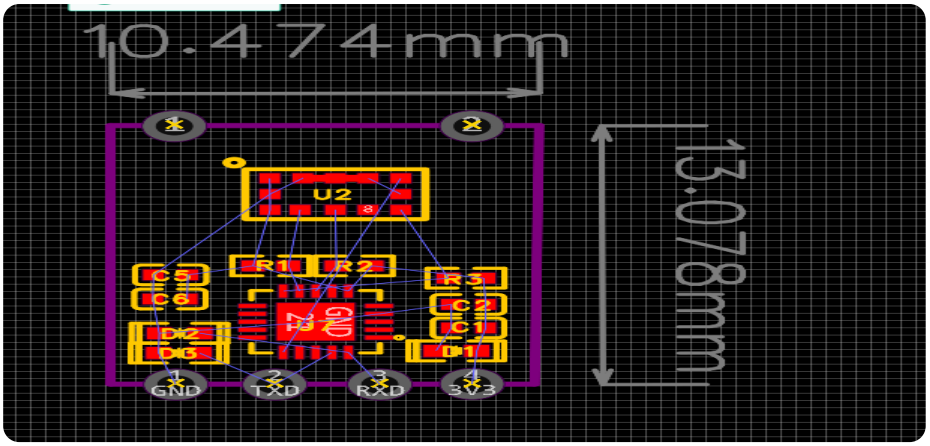


Figure 2-2 SM-10 PCB component layout (EDA export)

2.3 Mechanical Parameters

Item	Specification
PCB dimensions	10.474 mm × 13.078 mm
Board thickness	1.0 mm
PCB material	FR-4 (TG130 or above)
Mounting holes	2 corner holes (cross-marked positions)
Surface finish	ENIG (immersion gold)
Weight	approx. 1.5 g

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

2.4 Component Layout

RefDes	Package / Type	Function
U1	QFN leadless package	iToF laser ranging sensor IC
U2	8-pin connector	Board-to-board connection (pins 1–8)
U3	LGA package	3-axis accelerometer
U4	QFN package	Host MCU
R1, R2	0402 resistor	Pull-up / divider
R3	0402 resistor	Current limiting / impedance matching
C1, C2, C5, C6	0402 capacitor	Power filtering / decoupling
D2, D6	Diode	VCSEL emitter / PD receiver (integrated ranging solution)

3. Interface Definition

3.1 External Pads (Bottom)

Pin	Name	Type	Description
1	GND	P	Power ground
2	TXD	O	UART transmit (module → host), 3.3 V level
3	RXD	I	UART receive (host → module), 3.3 V level
4	3V3	P	Power input, 3.3 V

Note: P = power, I = input, O = output. Pin order follows Figure 2-2 left to right; refer to the actual silkscreen.

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

3.2 U2 Connector Pins

U2 is an 8-pin board-to-board connector. Pin definitions (assumed values, refer to actual unit):

Pin	Name	Function
1	3V3	Power
2	GND	Ground
3	TXD	UART transmit
4	RXD	UART receive
5	INT	Data-ready interrupt (open-drain)
6	EN	Enable / sleep control
7	NC	Reserved
8	GND	Ground

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

4. Functional Specifications

No.	Function	Description
F-01	Laser ranging	iToF ranging, 2 – 5 m, sub-millimeter accuracy (⩽ ±1 mm over full range)
F-02	3-axis attitude sensing	On-board 3-axis sensor, outputs 3-axis data, supports horizontal angle measurement
F-03	Serial output	UART digital output, default 115200 bps (9600 – 921600 bps configurable)
F-04	Autonomous reporting	Auto-report at configured rate in continuous mode, 10 Hz – 1/60 Hz
F-05	Command response	Single shot, continuous ranging, parameter setup, sleep/wake-up, version query, factory reset
F-06	Low-power mode	Sleep supported, sleep current < 10 µA (via EN pin or command)
F-07	Calibration	Factory calibrated; user-side offset calibration command supported

5. Technical Specifications

5.1 Electrical Characteristics

Item	Specification
Supply voltage	3.3 V (recommended 3.0 – 3.6 V)
Operating current	Typ. 40 mA (continuous ranging); average decreases with lower rate
Peak current	⩽ 100 mA (laser emission)
Sleep current	< 10 µA
I/O level	3.3 V (5 V tolerance requires external level shifting)
ESD protection	±2 kV contact / ±4 kV air (HBM)

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

5.2 Laser Ranging Performance

Item	Specification
Ranging principle	iToF (indirect Time-of-Flight)
Ranging range	2 m – 5 m
Ranging accuracy	Sub-millimeter (max error ⩽ ±1 mm over full range)
Ranging resolution	0.1 mm
Measurement rate	10 – 50 Hz (configurable)
Laser wavelength	850 nm (near-infrared)
Laser class	Class 1 (IEC 60825-1, eye-safe)
Field of view (FoV)	±25° (customizable)
Target reflectivity	10 % – 90 % (grey-scale targets; white wall is best-case)

5.3 3-Axis Sensor Performance

Item	Specification
Sensing axes	3-axis (X / Y / Z), 3-axis accelerometer (±2 g / ±4 g / ±8 g selectable)
Horizontal angle range	Within 2 – 5 m distance ±90° (pitch/roll, computed from 3-axis data)
Angle accuracy	±1° (static conditions)
Resolution	0.1°
Zero-offset drift	< 0.05°/°C (temperature drift)
Sampling rate	100 Hz (12.5 – 800 Hz configurable)

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

5.4 Environmental Conditions

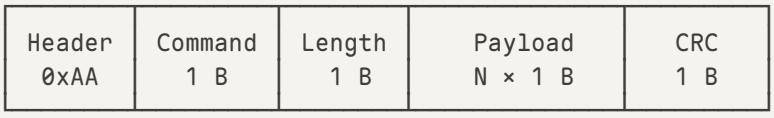
Item	Specification
Operating temperature	-20 °C to +70 °C
Storage temperature	-40 °C to +85 °C
Operating humidity	5 – 95 %RH (non-condensing)
Ambient light immunity	⩽ 5 klux (indoor strong light OK; degrades under direct sunlight)

5.5 UART Communication Parameters

Item	Specification
Interface	UART, 3.3 V level
Baud rate	Default 115200 bps (9600 – 921600 bps configurable)
Data format	8N1 (8 data bits, no parity, 1 stop bit)
Protocol	Binary frame protocol, see Section 6

6. Communication Protocol

6.1 Data Frame Format (Example)



Protocol Note

The frame format above is a generic example. Actual header, command set, byte order, and checksum algorithm (sum / CRC-8 / CRC-16) are defined by the production firmware.

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

6.2 Typical Communication Flow

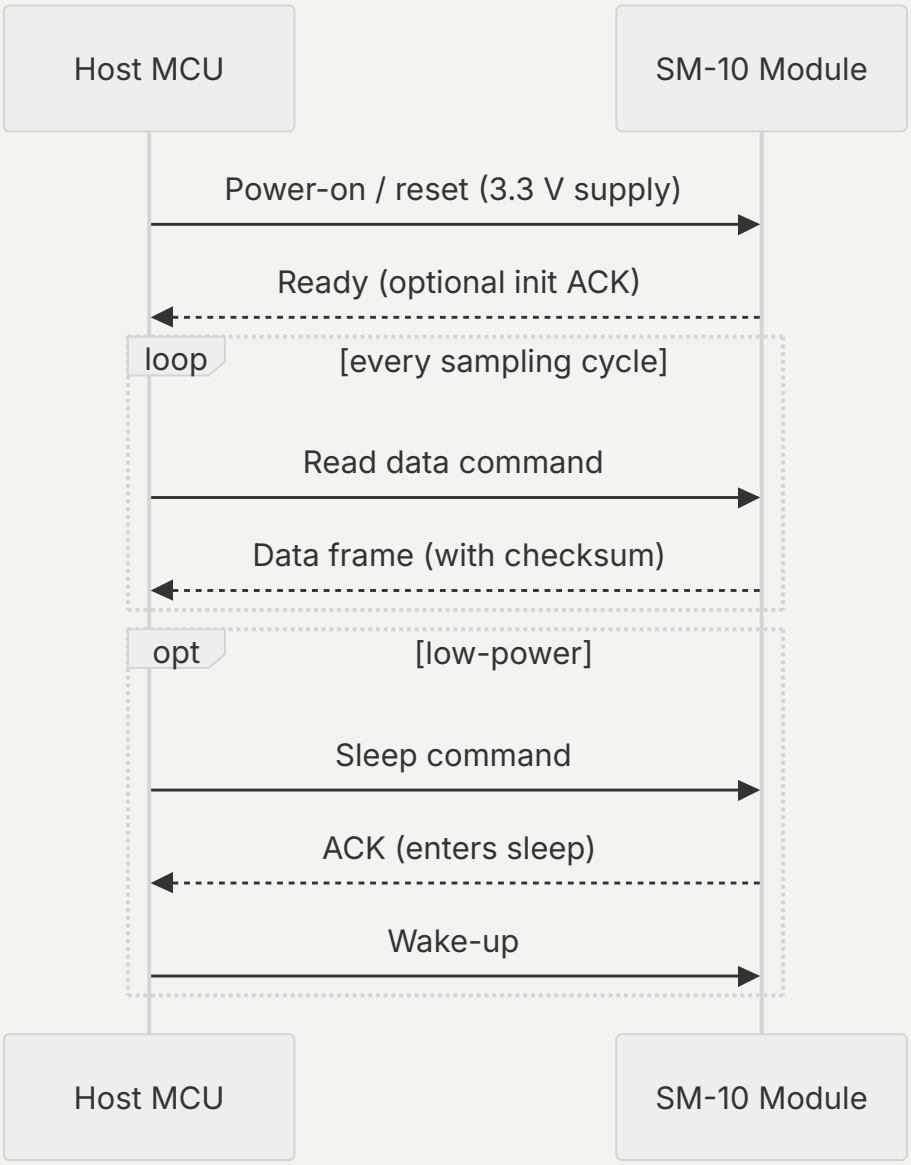


Figure 6-1 Typical communication flow between host MCU and SM-10

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

7. Reliability and Testing

Test Item	Standard	Result
High/low temperature operation	-20 °C / +70 °C, 48 h each	Pass (pre-filled, to be verified)
Damp heat, steady state	40 °C / 95 %RH, 48 h	Pass (to be verified)
Reflow soldering resistance	Peak 260 °C, 10 s, J-STD-020	Pass (to be verified)
Vibration	10 – 55 Hz, 1.5 mm double amplitude, 2 h/axis	Pass (to be verified)
Electrical safety	ESD / surge per GB/T 17626 series	Pass (to be verified)

8. Safety and Certifications

Item	Description
Safety	IEC 62368-1 / GB 4943.1
RoHS	EU RoHS 2.0 (2015/863, ten substances)
EMC	EN 55032 Class B / EN 55035
Laser safety	IEC 60825-1 Class 1 (eye-safe)

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

9. Packaging and Delivery

Item	Specification
Packaging	Anti-static tray (tape & reel optional, by order volume)
Minimum order quantity	100 pcs
Label information	Model, lot number, quantity
Storage conditions	MSL 3 (assemble within 168 h after opening, or bake as required)
Warranty	12 months from delivery

10. Appendix

Appendix A: Terms and Abbreviations

Term	Description
iToF	Indirect Time-of-Flight ranging technology
UART	Universal Asynchronous Receiver-Transmitter
QFN	Quad Flat No-leads package
FoV	Field of View
ENIG	Electroless Nickel Immersion Gold
MSL	Moisture Sensitivity Level
SMT	Surface Mount Technology

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com

Appendix B: Contact

Item	Content
Company	Hejiarun Electronic Technology Co., Ltd.
Address	Room 1016, Building B, Daoxing Global Science & Innovation Center, Xin'an Sub-district, Bao'an District, Shenzhen, China
Contact	Mr. Li
Phone	+86 13632956297
Email	dukeli@sh-mems.com

Distributed by SH-MEMS (Shenzhen Shuohong Technology) · Contact: Mr. Li +86 136 3295 6297 · shop.sh-mems.com