

50m High Precision Economical Laser Distance Sensor Module



Key Properties

- Measurement Range: 0.045~50m
- Measurement Frequency: 1~3 Hz
- Measurement Accuracy: $\leq 10\text{m}$ is $\pm 2\text{mm}$
 $> 10\text{m}$ is $\pm 2\text{mm} + 0.05 \times (D - 10)$, D is distance(mm)
- Wavelength: 650 nm
- Laser Safety: Class 2
- Communication Interface: TTL (UART)

Application

Industrial Manufacturing / Automation Equipment / Automatic Classification
 Rangefinder / Service Robot Positioning / Industrial & Livestock Stock Inspection
 Container capacity detection / Security camera triggering / Parking space detection

Product Code

Product	Measure Range	Frequency	Type	Communication Interface
LRF: Laser Rang Finder	50M: 50 meter	3: 3Hz	PS: Precise Standard	Default: TTL (UART) Option: USB (converter)
Example: LRF50M3PS				

Introduction

The LRF50M3PS is a cost-effectiveness solution designed for high-precision distance measurement. Despite its affordable, it delivers exceptional accuracy, making it ideal for precise measurements of static objects up to 50 meters. Note that for distances beyond 30 meters, the target reflectance should be above 80%. Strong ambient light will affect the performance of the ranging module, so it is recommended for indoor use.

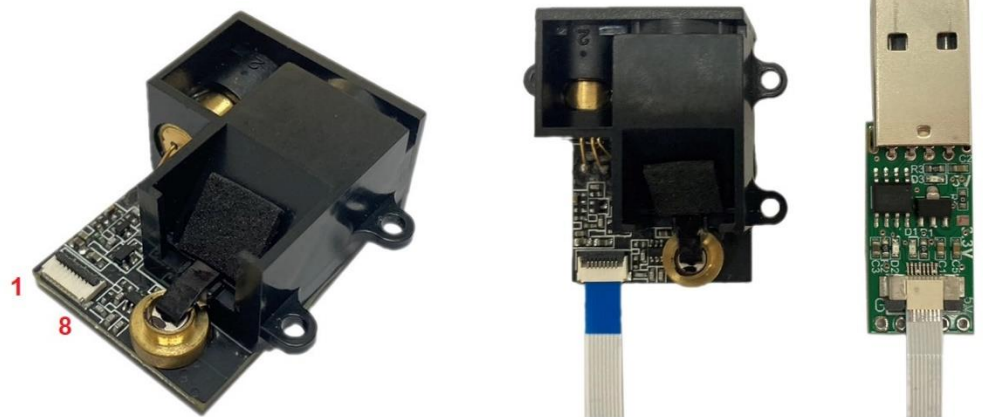
The LRF50M3PS is an advanced version of the LRF20M3PS, it features enhanced laser output and optical sensing design for extended measurement distances. Using TTL UART communication and FPC connectors for space efficiency, it is widely applied in security, industrial, detection, and automation applications.

1. Specifications

Technical specifications	
Model Name	LRF50M3PS
Measurement Range	0.045m ~ 50m (When distance ≥ 30m, the target reflectance should be ≥80%)
Measurement Frequency	1~3Hz
Measurement Accuracy	≤10m: ±2mm >10m: ±2mm+0.05x(D-10), D is distance(mm)
Wavelength	650nm
Laser Safety	<0.95mW, Class 2 (IEC 60825-1:2014)
Electrical	
Input Voltage	DC 3.3~3.6V
Power Consumption	0.15mA
Communication	
Communication Interface	3.3V TTL (UART)
Interface Connector	8 Position 0.5 mm FFC & FPC Connectors
Data Resolution	1mm
Baud Rate	115200 bps
Mechanical	
Dimensions	21 x 11 x 26mm
Weight	~8g
Environmental	
Operating Temperature	-10°C~50°C
Storage Temperature	-20°C~70°C

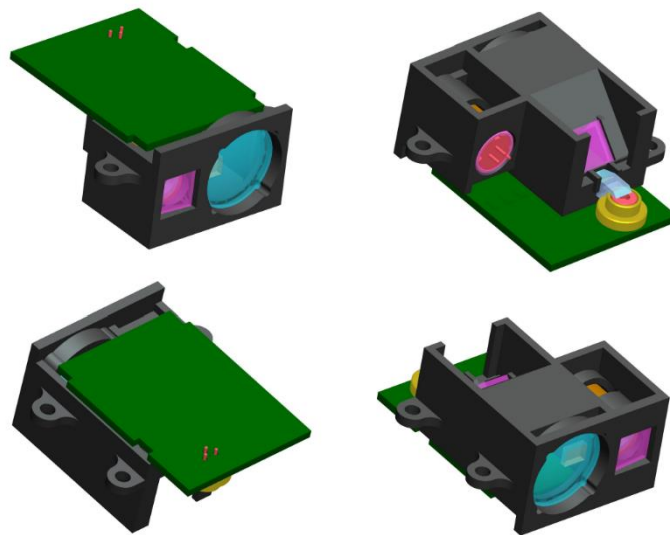
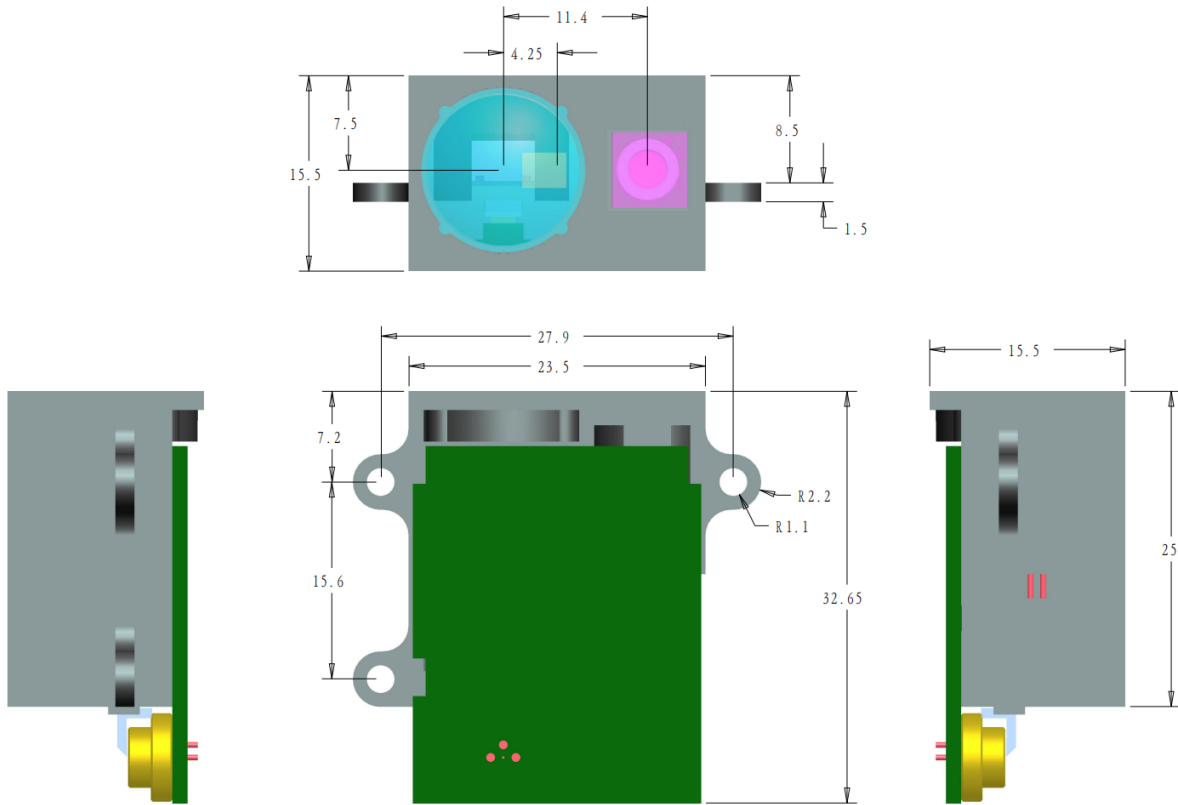
2. Pin Assignment

8 Position 0.5 mm FFC & FPC Connectors	
1	VCC
2	VCC
3	GND
4	GND
5	VCC
6	VCC
7	TXD
8	RXD





3. Dimensions



4. Communication

4.1 Communication frame format:

Head (1 byte ASCII)	Length (2 byte BCD)	Command (1 byte BCD)	Data (N byte BCD)	Checksum (1 byte BCD)	End (1 byte ASCII)
'\$'					'&'

* Length, Command, Data and Checksum are BCD type, and 1 byte of BCD is converted to 2 byte of ASCII code during transmission.

*Head: Fixed as '\$' in ASCII type.

*Length: Total number of byte from Command to Checksum.

*Command: Function identification, please refer to Chapter 5.1 Command List.

*Checksum: Length + Command + Data and divided by 100 to get the remainder.

Ex: Length is 6, Command is 10, Data is 12 34 56 78.

Checksum is 96 and the data packet sent is \$0006101234567896&.

*End: Fixed as '&' in ASCII type.

4.2 UART configuration parameters:

8N1 with default 115200 baud rate, byte data are expressed in ASCII.

Data bits: 8

Parity bits: None

Stop bits: 1

4.3 Device response

*Device responds immediately when receiving the command, if it receives the measurement command, it will respond first and then respond to the measurement result after calculation is completed.

*Command invalid response: '\$' + Length + 00 + Checksum + '&'

5. Command

5.1 Command List

Master Command	
Command code	Description
21	Single measurement
24	Continuous measurement (100 times)
26	Laser ON / OFF
33	Communication Test



5.2 Command Detail

5.2.1 Single measurement

Master sends					
Head1	Data Length	Command	Data	Checksum	End1
'\$'	2	21	-	23	'&'
Slave responses					
Head1	Data Length	Command	Data	Checksum	End1
'\$'	6	21	*DATA	*CHEC	'&'

*DATA: 4 byte BCD, equivalent to 8 byte ASCII
 Example: Send \$00022123&, Receive \$0006210000043061&.
 *Data is 00000430, means 430mm.
 *CHEC is 6+21+4+30= 61.
 *note: If the measurement result is invalid will return \$0006210000001643&.

5.2.2 Continuous measurement (100 times)

Master sends					
Head1	Data Length	Command	Data	Checksum	End1
'\$'	2	24	-	26	'&'
Slave responses					
Head1	Data Length	Command	Data	Checksum	End1
'\$'	16	24	*DATA	*CHEC	'&'

*DATA: 2 byte BCD(4 byte ASCII) for measured times.
 4 byte BCD(8 byte ASCII) for current measured distance.
 4 byte BCD(8 byte ASCII) for maximum measured value.
 4 byte BCD(8 byte ASCII) for minimum measured value.
 *CHEC is 16+24+6+4+76+17+20+4+76=243.
 Example: Send \$00022426&
 Receive \$001624000600000476000017200000047643&
 *0006 means is measured 6 times
 *00000476 means current distance is 476mm
 *00001720 means current maximum distance is 1720mm
 *00000476 means current minimum distance is 476mm



5.2.3 Laser ON / OFF

Master sends					
Head1	Data Length	Command	Data	Checksum	End1
'\$'	3	26	*DATA	* CHEC	'&'
Slave responses					
Head1	Data Length	Command	Data	Checksum	End1
'\$'	3	26	0	29	'&'

*DATA: 1 for Laser ON, 0 for Laser OFF
Example: Send \$0003260130& for Laser ON, Receive \$0003260130&
Send \$0003260029& for Laser OFF, Receive \$0003260029&

5.2.4 Communication Test

*This command is used to test the communication function,
Send \$00023335& should receive \$00023335&.



Laser Safety

The light emitted from these devices has been set in accordance with IEC60825. However, staring into the beam, whether directly or indirectly, must be avoided.

Class I

The maximum permissible exposure(MPE) cannot be exceeded, it includes High-power lasers within an enclosure that prevents exposure to the radiation and that cannot be opened without shutting down the laser. For example, a continuous laser at 600nm can emit up to 0.39mW, but for shorter wavelengths, the maximum emission is lower.

Class II

“Caution”, visible laser light less than 1.0mW. Considered eye safe, normal exposure to this type of beam will not cause permanent damage to the retina.

Class IIIA

“Danger”, visible laser light between 1.0mW and 5.0mW. Considered eye safe with caution. Focusing of this light into the eye could cause some damage.

Class IIIB

“Danger”, infrared(IR), and high power visible lasers considered dangerous to the retina if exposed. NB: it is important to note that while complying with the above classifications, unless otherwise stated. Our laser diode products are not certified and are designed solely for use in OEM products. The way in which device is used in the final product may alter its original design classification, and it is the responsibility of the OEM to ensure compliance with the relevant standards.

Specifications are subject to change without notice.

