



TFmini LiDAR Module

1. Product Overview

Coupled with unique optical and electrical design, the product is based upon ToF (Time of Flight) and adopts 850nm infrared light source so as to measure distance with stability, precision, high sensitivity, and high speed.

The product is built with algorithms adapted to various application environments so as to offer excellent distance measurement performances with low cost and small size. The product adopts multiple adjustable configurations for flexible use by the client, which is better to satisfy the end-users' demand.

2. Technical Specifications and Parameters

Table 1 Key Characteristic Parameters of TFmini

| | Description | Parameter value |
|-----------------------|---------------------------------|-----------------------------|
| Product performance | Operating Range(Indoor) | 0.3m~12m ^① |
| | Measurement accuracy | ±6cm@ (0.3-6m) ^② |
| | | ±1% @ (6m-12m) |
| | Range resolution | 1cm |
| | Frequency | 100Hz |
| | Default unit of distance output | cm |
| | Light sensitivity | 70klux |
| | Operating temperature | 0~60°C |
| Optical parameters | Light source | LED |
| | Wavelength | 850nm |
| | Receiving half angle | 1.15° |
| | Transmitting half angle | 1.5° |
| Electrical parameters | Power supply voltage | 5V |
| | Average current | ≤140mA |
| | Average power | ≤0.7W |
| | Peak current | 800mA |
| | Communication level | LVTTL (3.3V) |
| Others | Wiring length | 10cm |
| | Material of enclosure | ABS+PC |
| | Weight | 5±0.3g |
| | Storage temperature | -20°C ~75°C |



- ① This data is based on the indoor test with the standard white board (90% reflectivity) as the detection object.
- ② Maybe some errors of $\pm 6\text{cm}$ occurs due to the switchover of different distance modes within 0.3-2m.

3. Product Appearance and Structure

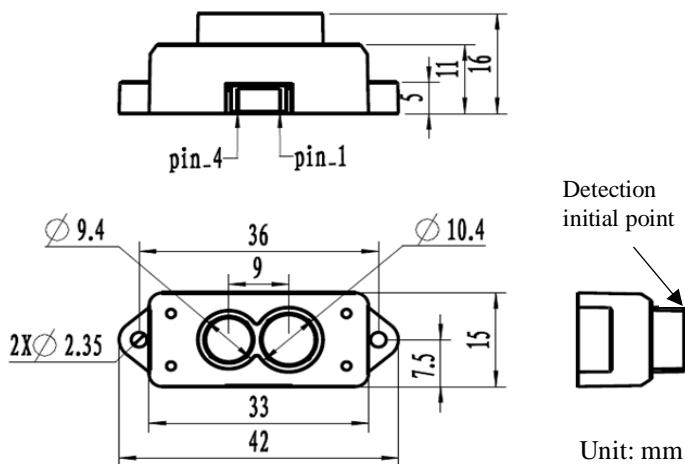


Figure 1 Dimensional Drawing of TFmini

4. Definition of Product's Connector

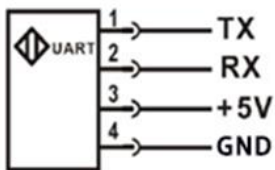


Figure 2 Line Sequence Diagram of TFmini

TFmini is equipped with the connector of GH1.25-4p type. The line sequence is shown in Figure 2. The positions of the product pins are shown in Figure 1.

5. Communication Protocol and Data Format

Table 2 Product Communication Protocol

| Communication interface | UART |
|-------------------------|---------------------|
| Default baud rate | 115200 (adjustable) |
| Data bit | 8 |
| Stop bit | 1 |
| Parity check | None |

Table 3 Standard Data Code Format and Description

| Byte0-1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---------|--------|--------|------------|------------|-------|-------|----------|
| 0x59 59 | Dist_L | Dist_H | Strength_L | Strength_H | Mode | 0x00 | Checksum |



| Data code explanation | |
|-----------------------|---|
| Byte0-1 | 0x59 59, frame header, same for each frame |
| Byte2-3 | Dist represents the distance detection values, with the data format in little-endian. |
| Byte4-5 | Strength, signal strength at current distance ,with the data format in little-endian, |
| Byte6 | Mode, distance mode, represented respectively by 02 (short distance) and 07 (long distance), automatically switchable by default. |
| Byte7 | Spare byte, 00 by default |
| Byte8 | Checksum is the low 8 bits of the cumulative sum of the numbers of the first 8 bytes. |

6. Configurable Parameters

6.1 General Parameter Configuration commands

Before modifying the product configuration, input 42 57 02 00 00 00 01 02 to enter configuration mode, and then input the relevant configuration commands in Table 4. After completing the configuration, input the 42 57 02 00 00 00 00 02 to quit the configuration mode.

Table 4 List of General Parameter Configuration commands

| Configurable items | List of commands | Description | Default |
|---|-------------------------|--|-------------------------------|
| Output data format | 42 57 02 00 00 00 01 06 | Standard format, as shown in Table 3 | √ |
| | 42 57 02 00 00 00 04 06 | “Pixhawk” data format | / |
| Data output period | 42 57 02 00 EE FF 00 07 | EE FF: setting of output period (ms) it must be the integral multiple of 10ms | 10ms/ 100Hz |
| Unit of distance | 42 57 02 00 00 00 00 1A | Output unit of distance data is mm | / |
| | 42 57 02 00 00 00 01 1A | Output unit of distance data is cm | √ |
| Detection Pattern | 42 57 02 00 00 00 00 14 | Automatic detection pattern | √ |
| | 42 57 02 00 00 00 01 14 | Fix detection pattern | / |
| Distance mode | 42 57 02 00 00 00 02 11 | Short distance mode, applicable for 0-5m ^① | |
| | 42 57 02 00 00 00 07 11 | Long distance mode, applicable for 1-12m | / |
| Setting of range limit | 42 57 02 00 00 00 00 19 | Range limit disabled | |
| | 42 57 02 00 EE FF 01 19 | Range limit enabled EE FF: threshold of ranging limit (mm) | Range limit 12m |
| lower limit of signal strength threshold | 42 57 02 00 EE 00 00 20 | EE: setting of the lower limit of signal strength threshold. If the real signal is lower than the set threshold, “FF FF” will be output as the distance value which means invalid. | Lower threshold 20(DEC) |
| upper limit of signal strength threshold | 42 57 02 00 EE FF GG 21 | EE FF: setting of the upper limit of signal strength threshold GG: output distance value (cm) | / |

①: This command is related to the firmware version. At present, only the version before 160 is supported (that is, the version number ends with 15X); for the 160 or later version, the command code is changed to: 42 57 02 00 00 00 00 11



(Short distance mode, 0-2m applicable); 42 57 02 00 00 00 03 11 (middle distance mode, 0.5-5m applicable).

6.2 Advanced Parameter Configuration commands

Advanced parameter configuration commands. Input 42 57 02 00 00 00 01 02 to enter the configuration mode, and then input the relative command as the Table 5.

Table 5 Special Parameter Configuration and Description

| Configurable items | List of commands | Description | Default |
|----------------------------|-------------------------|--|---------|
| Setting of baud rate | 42 57 02 00 00 00 GG 08 | The baud rate corresponding to GG is shown in Table 6. | 115200 |
| Setting of trigger sources | 42 57 02 00 00 00 01 40 | Internal trigger, 100Hz as default | √ |
| | 42 57 02 00 00 00 00 40 | External trigger | / |
| External trigger setting | 42 57 02 00 00 00 00 41 | command for one single measurement | |
| Reset | 42 57 02 00 FF FF FF FF | All settings are reset to the default | / |

Table 6 Corresponding List of Baud Rate Settings

| GG | 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 |
|-----------|--------|--------|--------|--------|--------|--------|--------|
| Baud rate | 9600 | 14400 | 19200 | 38400 | 56000 | 57600 | 115200 |
| GG | 0x07 | 0x08 | 0x09 | 0x0a | 0x0b | 0x0c | / |
| Baud rate | 128000 | 230400 | 256000 | 460800 | 500000 | 512000 | / |

7. Remote Upgrade

TFmini supports remote upgrade. The user can obtain the following information by Upgrade PC software of TFmini. ① Program version No.② Product serial No.

The user is kindly required to select product program version depending upon the actual demands. For details, refer to the Product Manual of TFmini.

8. Product Certification

