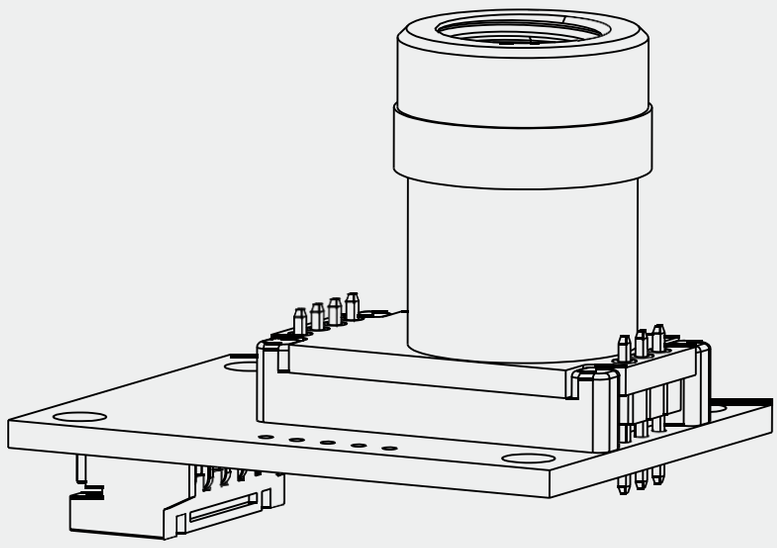
MEMSFRONTIER
美思先端

MTP 31-A

Infrared Temperature Sensor Module

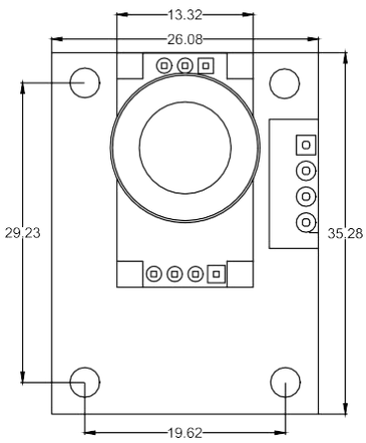


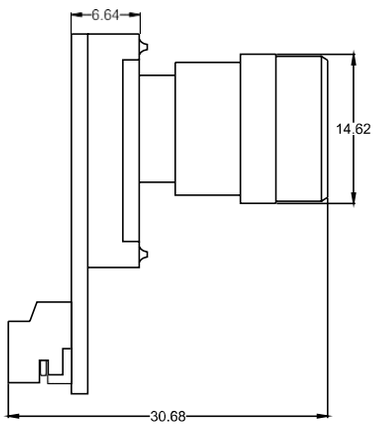
SPECIFICATION

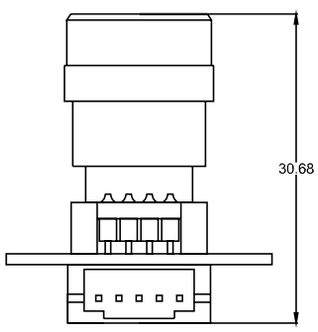
MTP 31-A

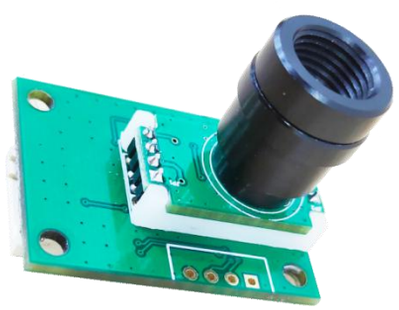
Infrared Temperature Sensor Module

◆ Appearances and Dimensions









◆ Product Overview

The MTP31-A infrared temperature sensor module integrates a MEMS infrared thermopile temperature sensor, a low-noise instrumentation amplifier (PGA), a 12-bit Σ-Δ ADC, and a low-power MCU for digital operation and temperature calibration. It supports calibration of the temperature drift of the sensor's zero point and sensitivity, and the digital calibration accuracy can be within 0.1°C. The calibration parameters are stored in the MCU's non-volatile memory and are calculated in real time by the built-in DSP. MemsFrontier's advanced algorithm expertise ensures the accuracy of temperature measurement at long distances. At the same time, it supports UART and I2C digital output, so that customers can quickly and conveniently use the temperature measurement function, which greatly improves the development efficiency.

◆ Main Features and Applications

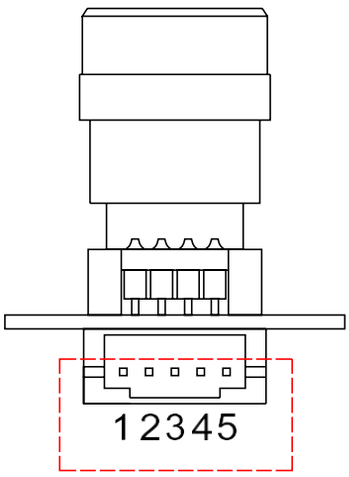
Main Features

- MEMS thermopile technology
- Body temperature mode compensation algorithm
- ＜3.5 mA ultra-low power consumption
- 4.5~ 5.5V battery-powered
- Complete factory calibration (+/- 0.3C for body temperature mode)
- Remote temperature measurement (DS ratio 4:1)
- UART and I2C digital output
- Excellent long-term stability

Applications

- Face recognition machine
- Attendance machine
- Temperature measuring door
- Security check

◆ PIN Assignment



No.	Name
1	Vin
2	GND
3	Host-TX
4	Host-RX
5	NC

◆ Specifications

MTP31-A	
Temperature Range	body temperature mode 32~42.5 ℃ object (surface) temperature mode 0~80 ℃
Accuracy	±0.3 ℃ for body temperature mode ±1 ℃ /±1% m.v for object (surface) temperature mode
Digital Resolution	0.1 ℃
Measurement Period	0.5 s Note 1
Supply Voltage	4.5~5.5 V
Operating Current	< 2 mA
Output Signal	UART, II2C
Communication Level	TTL 3.3 V
Temperature Compensation	10.0 ~ 40.0 °C
Viewing Angle	12.4° Note 2
Spectral Response	5.5-14 μm
LxWxH	34×26×25 mm
Operating Temperature Range	0-50 ℃
Operating Humidity Range	0-95%RH non-condensing

Note 1: The measurement period can be set.

Note 2: For 50% signal strength, refer to the left view-signal strength graph.

◆ Serial Communication Protocol

Baud Rate	Data Bit	Check Digit	Stop Bit
9600	8	None	1

Packet Structure

Packet header--MSB--LSB--SUM--Ending Character

The header of the data packet is the command symbol: 0x4C, 0x4D, 0x66, 0x53, 0x54

MSB: High byte with 16bit data

LSB: Low byte with 16bit data

SUM: packet header + MSB + LSB (SUM is the low byte of the sum)

Ending Character: 0x0D

NO.	Function	Directives	16bit Data		SUM	Ending Character
		packet header	MSB	LSB		
1	Read the temperature value of the target object with the value of the emission coefficient stored in the module	0x4C	0xAA	0x55	packet header+MSB+LSB Low byte of sum	0x0D
2	Manually set the emission coefficient value, read the temperature value of the target object	0x4D		0x0A~0x64		
3	Read the internal temperature value of the module	0x66		0x55		
4	Change the emissive coefficient value stored in the module	0x53		0x0A~0x64		
5	Read the emissive coefficient value stored in the module	0x54		0x55		

◆ Functioning Example

1.Use the emission coefficient value stored in the module to read the temperature value of the target object.

Example
The PC sends commands through the serial port:
0x4C, 0xAA, 0x55, 0x4B, 0x0D

The module returns data through the serial port:
0x4C, 0x14, 0x2A, 0x8A, 0x0D

0x14 and 0x2A are the measured target temperature data, the calculation method is as follows:
a) 0x142A is converted into a floating point number to get 5162;
b) 5162/16 = 322.625;
c) 322.625-273.15 = 49.475;
The target temperature is 49.475°C

2. Manually set the emission coefficient value and read the temperature value of the target object.

The artificially set emission coefficient value is placed in the LSB byte, and the data range is 10~100 (0x0A~0x64, which means the emissivity is 0.10~1.00). Other setting values out of the range are invalid, and the module will use the emission coefficient value of 95, That is, the emissivity is 0.95 for calculation.

Example
The PC sends commands through the serial port:
0x4D, 0xAA, 0x64, 0x5B, 0x0D
(Set the emission coefficient value to be 100, 0x64, that is, the emission rate is 1.00)
The module returns data through the serial port:
0x4D, 0x14, 0x2A, 0x8B, 0x0D
The temperature calculation method is the same as above. 49.475°C

3. Read the internal temperature value of the module

Example
The PC sends commands through the serial port:
0x66, 0xAA, 0x55, 0x65, 0x0D
The module returns data through the serial port:
0x66, 0x12, 0xC3, 0x3B, 0x0D
The temperature calculation method is the same as above. 27.037°C

4. Change the emission coefficient value stored in the module

The emission coefficient value stored in the module to be written is placed in the LSB byte, and the data range is 10~100 (0x0A~0x64, representing the emissivity 0.10~1.00), other setting values out of the range are invalid. The default emission coefficient value of the module is 95, that is, the emission rate is 0.95.The module returns the actually written emission coefficient value.

Example 1

The PC sends commands through the serial port:

0x53, 0xAA, 0x64, 0x61, 0x0D

(The emissive coefficient value stored in the module to be written is 100, the normal value in the range, 0x64, that is, the emissivity is 1.00)

The module returns data through the serial port:

0x53, 0x55, 0x64, 0x0C, 0x0D

(The actual written emission coefficient value is 100, 0x64, that is, the emission rate is 1.00)

Example 2

The PC sends commands through the serial port:

0x53, 0xAA, 0xFF, 0xFC,0x0D

(The emission coefficient value stored in the module to be written is 255, the value is not in the range, 0xFF, the writing is unsuccessful, the default emission coefficient value of the module is 95, that is, the emissivity is 0.95)

The module returns data through the serial port:

0x53, 0x55, 0x5F, 0x07, 0x0D

(The actual written emission coefficient value is 95, 0x5F, that is, the emissivity is 0.95)

5. Read the emission coefficient value stored in the module

Example

The PC sends commands through the serial port:

0x54, 0xAA, 0x55, 0x53, 0x0D

The module returns data through the serial port:

0x54, 0x55, 0x64, 0x0D, 0x0D

(The emission coefficient value stored by the module is placed in the LSB byte, and the currently stored emission coefficient value is 100, 0x64, that is, the emissivity is 1.00)

◆ Version

Date	Version	Update
2021-4-11	2.00	Revision