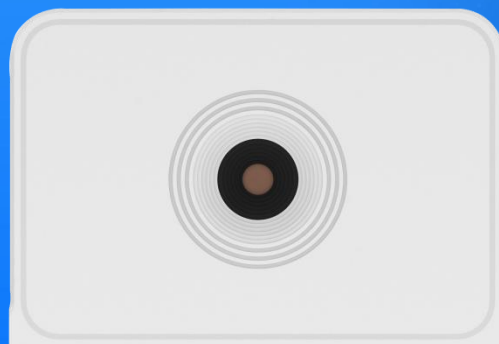


FT10

256*192

Uncooled Temperature Measuring Thermal Imaging Module

Accurate Temperature Measuring



Product Description

The temperature measuring thermal imaging module is developed based on wafer chip scale packaging uncooled vanadium oxide infrared detector, fit for working with various intelligent platform. It boasts the features of high performance, low power consumption, small size and easy for development and integration. It meets the secondary development requirement of various infrared temperature measuring applications.

Product Features

- Small size, easy integrated, size :62mm (L)*42mm(W)*25mm(H);
- USB interface, easy to connect;
- Low power consumption;
- High image quality
- Accurate temperature measurement;
- Standard data interface, supporting secondary development, easy to integrate, and supporting access to various intelligent processing platforms.

Product performance parameters

Model	FT10
Resolution	256×192
Cellspacing	12 μm
Angle of view	25.5° × 19.2°
Image frame rate	25Hz/15Hz
NETD	≤60mK@f#1.0
Operating temperature	-15°C ~ +60°C
Supply voltage	3.8V-5.5V DC
Power consumption	<200mW*
Weight	<18g
Size / mm	62*42*25
Data interface	Control interface/USB
Control interface	SPI/I2C/USB
Image enhancement	Multi-gear detail enhancement
Picture correction	Shutter correction
Swatches	White Hot/Black Hot/Multiple Pseudo Color Options
Temp measurement range	0 °C ~ + 60 °C

Temp measurement accuracy	$\pm 0.5\text{ }^{\circ}\text{C} / \pm 5\%$ of range
Temp correction	Manual / Auto
Temperature data output	Real-time parallel output
Temp measurement statistics	Support maximum / minimum statistics, Temperature analysis
Model	FT10
Resolution	256×192
Cellspacing	12μm
Angle of view	25.5°×19.2°
Image frame rate	25Hz/15Hz
NETD	$\leq 60\text{mK}@f\#1.0$
Operating temperature	-15°C ~ +60°C
Supply voltage	3.8V-5.5V DC
Power consumption	<200mW*
weight	<18g
Size / mm	20*20*21
Data interface	Control interface/USB
Control interface	SPI/I2C/USB
Image enhancement	Multi-gear detail enhancement

Picture correction	Shutter correction
Swatches	White Hot/Black Hot/Multiple Pseudo Color Options
Temp measurement range	-20 °C ~ + 120 °C (expandable to 600 °C)
Temp measurement accuracy	± 0.5 °C / ± 5% of range
Temp correction	Manual / Auto
Temperature data output	Real-time parallel output
Temp measurement statistics	Support maximum / minimum statistics, Temperature analysis

* Parallel interface in 25Hz output mode

4 User interface description

The product uses a sub interface, the input voltage is: 3.8 ~ 5.5VDC, does not support overvoltage and undervoltage protection

Serial No.	Name	Type	Voltage	Description	
1,2	VCC	Power	--	Power Supply	
3,4,12	GND	Power	--	Ground	
5	USB_DM	I/O	--	USB 2.0	DM
6	USB_DP	I/O	--		DP
7	USBEN*	I	--	Enable USB	
8	SPI_SCK	I	Default:1.8V	SPI	SCK
9	SPI_SDO	O	LVC MOS ;		SDO
10	SPI_SDI	I	(if need 3.3V		SDI
11	SPI_SS	I			SS
13	DV_CLK	O	LVCOMS output, please contact us	VIDEO	CLK
14	DV_VS	O			VS
15	DV_HS	O			HS
16	DV_D0	O			DATA0

17	DV_D1	O			DATA1
18	DV_D2	O			DATA2
19	DV_D3	O			DATA3
20	DV_D4	O			DATA4
21	DV_D5	O			DATA5
22	DV_D6	O			DATA6
23	DV_D7	O			DATA7
24	DV_D8	O			DATA8
25	DV_D9	O			DATA9
26	DV_D10	O			DATA1 0
27	DV_D11	O			DATA1 1
28	DV_D12	O			DATA1 2
29	DV_D13	O			DATA1 3
30	DV_D14	O			DATA1 4
31	DV_D15	O			DATA1 5
32	I2C_SCL	I		I2C	SCL
33	I2C_SDA	I/O			SDA

Pin5, Pin6 default USB2.0, compatible 3.3V TTL UART interface, if need UART interface pls contact us ; Attention: Pin5: TX; Pin6: RX; TX, RX Relative Xmodule S0;

When the USB_EN pin high level, the 5 and 6 pins working as USB data pins, USB communication uses UVC communication protocol, the image format is YUV422, if you need USB communication development kit, please contact us;

In PCB design, parallel digital video signal 50 Ω impedance suggested.

Table 3 Electrical Characteristics

Typical VIN =4V, TA = 25°C

Parameter	Symbols	Test Conditions	MIN	TYP	MAX	Unit
Input Voltage Range	VIN	--	3.8	4	5.5	V
Load	ILOAD	USBEN=GND		75	300	mA
		USBEN=HIGH		110	340	mA
USB Enable Control	USBEN-LOW	--			0.4	V
	USBEN-HIGH	--	1.4		5.5V	V

Table 4 Absolute Maximum Ratings

Parameters	Range
VIN to GND	-0.3V to +6V
DP,DM to GND	-0.3V to +6V
USBEN to GND	-0.3V to 10V
SPI to GND	-0.3V to +3.3V
VIDEO to GND	-0.3V to +3.3V
I2C to GND	-0.3V to +3.3V
Storage Temperature	-55°C to +120°C
Operating Temperature	-40°C to +85°C

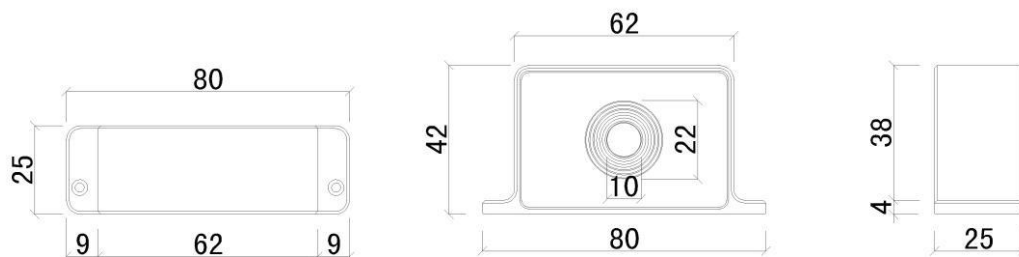
CAUTION: Meeting or exceeding the ranges listed under Absolute Maximum Ratings may cause permanent damage to the product. Operation that exceeds the maximum working conditions for a long time may affect the reliability of the product.

5. Attention

To protect you and others from injury or protect your device from damage, please read all the information below before using your device.

1. Make sure the camera doesn't look directly at high-intensity radiation sources such as the sun;
2. Do not touch the detector window with your hands or other objects;
3. Do not touch the device and cables with wet hands;
4. Do not bend or damage the connecting cables;
5. Do not scrub your equipment with thinner;
6. Do not plug or unplug other cables without disconnecting power;
7. Please do not connect the attached connecting cable incorrectly to avoid damage to the device;
8. Please pay attention to prevent static electricity;
9. Do not disassemble the device. If there is a malfunction, please contact our company and have it repaired by professionals

Product Size



Appendix 3 I2C Control Protocol

Table 3 Module I2C address 7bit device address (0x18), read address 0x31, write address 0x30.

Serial number	Register address	Parameter	Description
1	0x80	0x00	Shutter correction *
2		0x01	Background correction
3		0x02	Detector raw output
4		0x05	Image data output
5		0x20	Normal temperature measurement
6		0x21	Extended temperature measurement
7		0x27	16-bit parallel image output
8		0x28	8-bit parallel image output
9		0x29	16-bit parallel image + temperature data output
10		0x2A	8-bit parallel image + temperature data output
11		0x2B	Load temperature measurement parameters
12		0xFE	Save configuration parameters
13	0x88	0-7	Swatches
14	0x96	float type	Target reflection temperature (default 25 °C)
15	0x97	float type	Target ambient temperature (default 25 °C)
16	0x98	float type	Ambient humidity (default 0.45)

17	0x99	float type	Target emissivity (default 0.98)
18	0x9a	float type	Target distance(default 1m)

* Shutter correction function can correct the non-uniformity of infrared images and the accuracy of temperature measurement; the device needs 5-10min to stabilize during the boot process; the device defaults to 3 times of start-up shutter correction, after that, it is not corrected by default, and the back end can periodically call the shutter correction, correct the image and temperature data.

Register status read:

Serial Number	Register address	Return parameter	Description
1	0x01	16 bytes	Device PN code
2	0x02	7 bytes	Device SN code
3	0x04	16 bytes	Software version number
4	0x05	4 bytes	fpa temperature (float type)
5	0x06	2 bytes	Shutter temperature (same as temperature data format)
6	0x0A	1 byte	Swatches
7	0x:80	1 byte	[0-2]: data source [3]: temperature measurement range, 0 normal temperature 1 Wide temperature [4-7]: Parallel interface output type:

