Datasheet Thermopile Module
Type HID A1x Fx Tx (PWM)

Features and Benefits

- Non-contact surface temperature detection with digital temperature output
- Thermopile Sensor and ASIC in TO-5/TO-39 housing with 4 leads
- Digital temperature or sensor voltage output (SMBus compatible or PWM)
- Temperature resolution < 0.1°C at T200 and SMBus compatible operation
- High accuracy over wide sensor temperature and object temperature ranges
- 3V and 5V versions available
- Complies with ROHS regulations

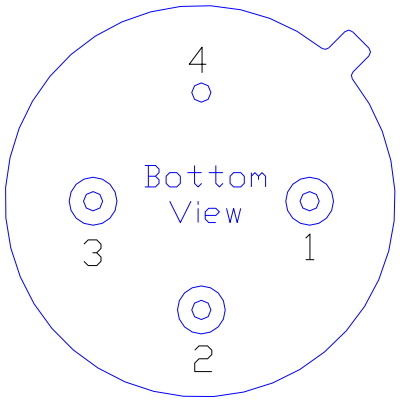
Ordering Information

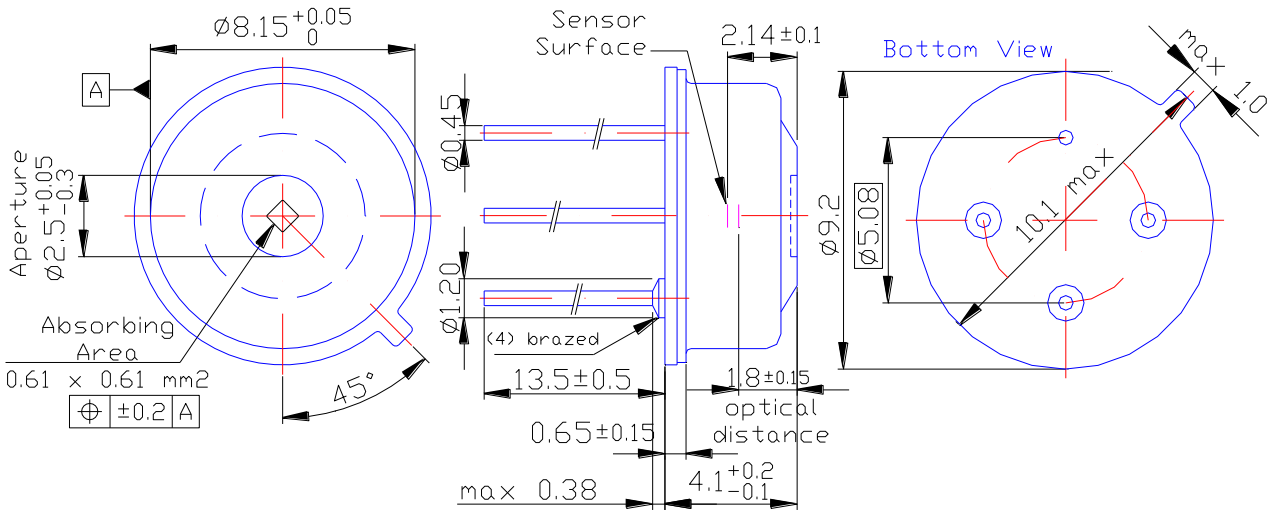
HID -> Heimann thermopile sensor and ASIC in TO-5 housing
A1 -> „A" standard cap TO-39 ; „1" sensor chip TP1
x -> ASIC supply voltage „4" : 5V or „5" : 3V
Fx -> selectable filter type: F5.5 (LWP cut on 5.5µm) or F8-14 (BP HPB 8-14µm)
Tx -> Object temperature range, max. temperature range on digital output 382°C
(PWM) -> optional: „PWM" output - SDA/PWM-pin adusted to pulse width modulation

e.g. HID A14 F5.5 T200 -> 5V supply voltage , an object temperature range 200°C

Pin Configuration and Dimensional Drawing

Pin	*Symb*	*Description*
1	SCL	Digital input , serial clock in SMBus compatible mode
2	SDA/ PWM	Digital I/O in SMBus compatible mode or pulse width modulated temperature(s) output in PWM mode
3	VDD	Positive supply voltage
4	VSS	Negative supply voltage / Ground (0V) (connected to housing)





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Maximum Ratings

Parameter	*Max. value*	*Unit*	*Condition*
Supply voltage 1 VDD	7	V	Type 5V
Supply voltage 2 VDD	5	V	Type 3V
Reverse voltage	0.4	V	Ground
ESD sensitivity	2	kV	Human body
Storage temperature	-40.. 125	°C	

Operating Conditions

Parameter	*Typical Value*	*Unit*	*Condition*
Supply voltage 1 VDD	5	V	Preset option "x -> 4"
Supply voltage 2 VDD	3	V	Preset option "x -> 5"
Supply voltage VSS	0	V	Ground
Supply current	1	mA	Without load
Start up time after POR	0.15	sec	
Sensor absorbing area	0.61 x 0.61	mm²	Type TP1
Object temperature range	-40 .. max.+380	°C	maximum "T380", at maximum gain "T200"
Field of view	70	°	50% energy points
Response time	5	ms	Sensor chip
Refresh rate	100	ms	Temperature output
IR transmission (long wave pass)	>70	%	Within wavelength range 7.5µm to 13µm (cut on 5.5µm)
Operating temperature	-40.. 125	°C	
Slave address	5Ah	hex	Factory default
Interface SM-Bus (default)	2-wire SMBus compatible, factory default without interface indication, output configured as open drain NMOS by default		
Interface PWM (type .. PWM)	1-wire PWM output on SDA/PWM, 10 bit resolution default settings: push-pull, single PWM, output of object temperature sensor 1		

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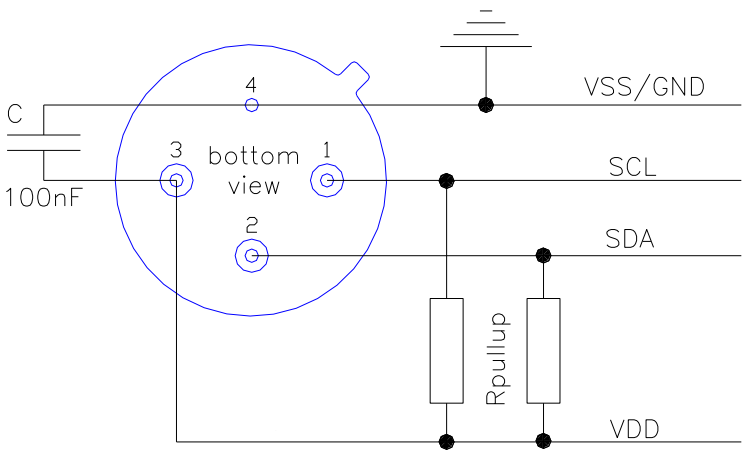
Applications Circuitry SM-Bus Operation

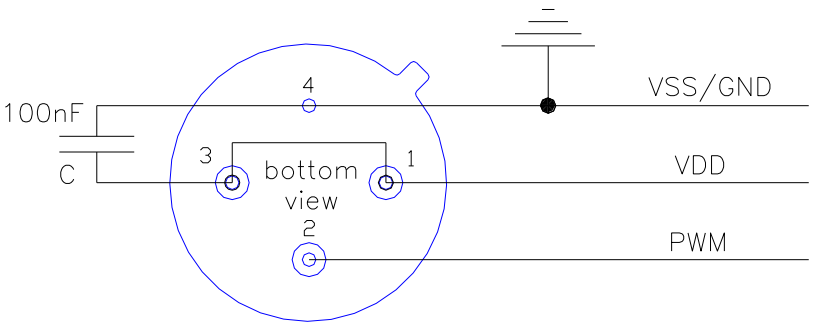


Pull-up resistor recommendation:

low power applications 20kOhm (SM-Bus DC specification Ipullup 100µA .. 350µA)

high power applications 1.5kOhm (SM-Bus DC specification Ipullup min. 4mA)

Applications Circuitry PWM Operation



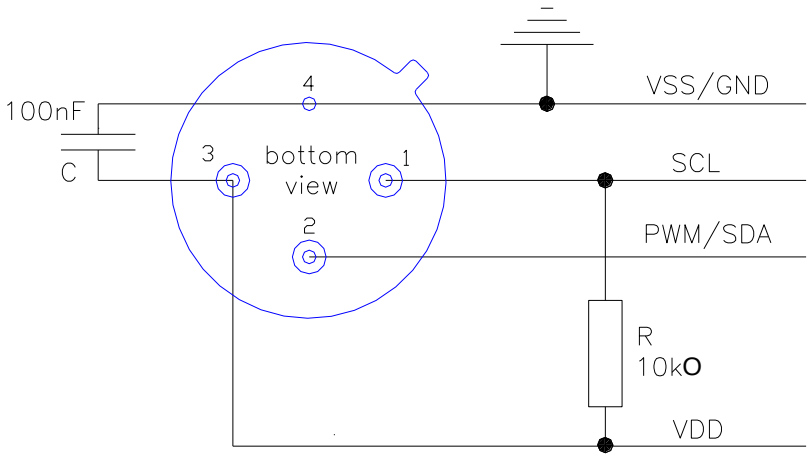
PWM mode is free running after power on.

Pin 3 (SCL) must be forced high for PWM mode

PWM output is configured as push pull

Default PWM output of object temperature 1

Applications Circuitry PWM Operation with SM-Bus Option



PWM mode is free running after power on.

SM-Bus operation available by added pull-up resistor

PWM output is configured as push pull

Default PWM output of object temperature 1

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Temperature Performance

Object Temperature [°C]	Sensor (Ambient) Temperature [°C]				Temperature Accuracy [°C]
	-40 .. 0	0 .. 50	50 .. 100	100 .. 125	
-30 .. 0	±3°C	±2°C	±3°C	±4°C	
0 .. 60	±2°C	±1°C	±1.5°C	±2.5°C	
60 .. 120	±3°C	±2°C	±2°C	±3°C	
120 .. 180	±4°C	±2°C	±2.5°C	±3.5°C	
180 .. 240	±5°C	±3°C	±3°C	±4°C	
240 .. 300	±5°C	±4°C	±4°C	±5°C	

Notes to the temperature performance:

- The specified temperature performance presents preliminary findings based on sample investigations using special test equipment.
- The temperature accuracies are achievable by following conditions
  - thermal equilibrium of the sensor
  - no temperature differences in the sensor package
  - the object fills the sensor field of view completely
  - homogenously distributed temperature on the object surface
  - high and uniform emissivity of the object surface in the interesting infrared range

Liability

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